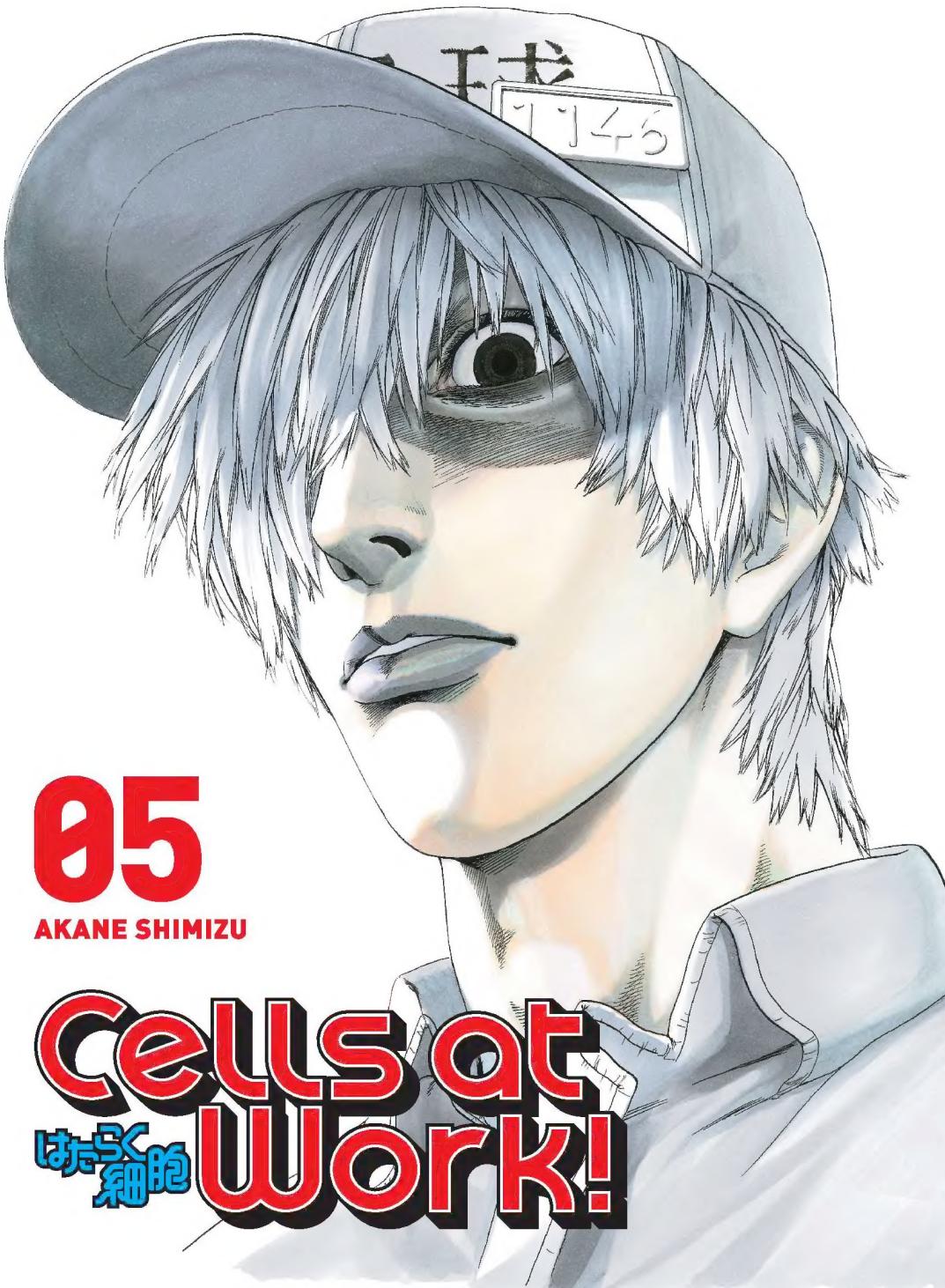


Cells at Work!



AKANE SHIMIZU

05



05

AKANE SHIMIZU

Cells at Work!

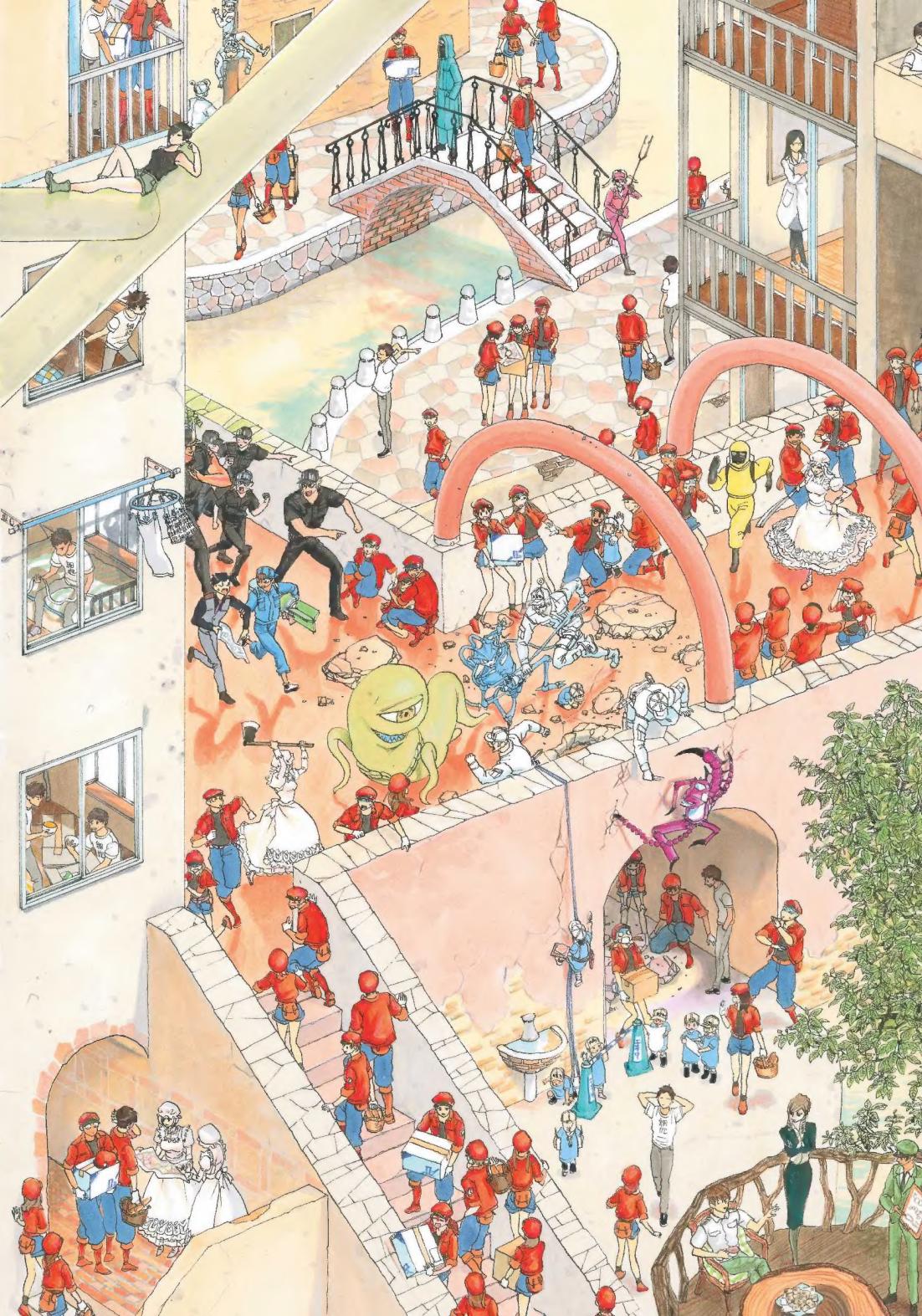
はたらく細胞

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Chapter 21	Antigenic Shift	045
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Chapter 23	Harmful Bacteria	107
Chapter 24	Cancer Cell II (Part I)	141
Chapter 25	Cancer Cell II (Part II)	175







WE'VE GOT
A SITUATION
NEAR THE PHARYNX!

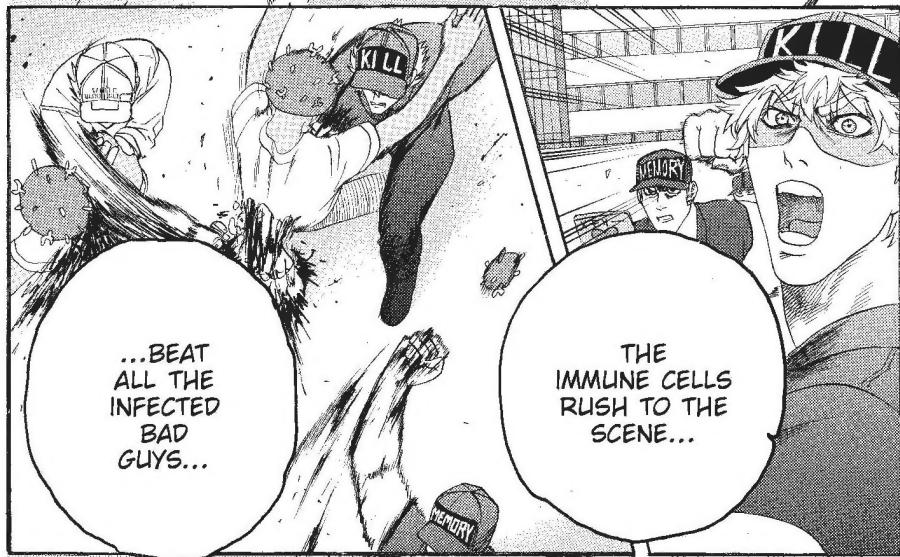


VIRUS-
INFECTED
CELLS!

IMMUNE
CELLS ARE
TO DEPLOY
IMMEDIATELY
TO THE
SITE!

CHAPTER 20: H. PYLORI

AND IT'S
THE SAME
STORY
ALL OVER
AGAIN....





...ORDINARY
CELLS LIKE
US DON'T
GET TO DO
A THING.



SOOO
BORING...

EVEN
RHINOVIRUS IS
GONE.



SIGH. NOW
THAT MY
COPY'S LIVING
ON HIS OWN,
I'VE GOT
NO BUDDIES
AROUND.

THEY'RE JUST
KILLERS, BUT
THEY ACT LIKE
SUPERHEROES!

HIP P P P
WHOOOSH

P P P

OUT OF
SERVICE

WHO
DO THOSE
IMMUNE
CELLS THINK
THEY ARE,
ANYWAY?

JUST
ONE
TIME!

THANK
YOU
FOR
SAVING
ME!

SHOOT...
JUST ONCE,
I'D LIKE
TO HELP
SOMEONE
SO THEY'D
BE ALL:

WISH

HIP P P

AND WHEN WE GET
ATTACKED BY VIRUSES, THEY
SCOLD US FOR NOT DEFENDING
OURSELVES PROPERLY AND
NOT BEING AWARE OF THE
DANGERS.

I'M GETTING
ANGRY JUST
REMEMBERING.

ONLY IF
I WERE
STRONGER

...

SIGH...

HIP VS BUSTLE

HIP VS BUSTLE

NYUUU!

NYUUU!

WHOOOSH

...HUUH?

SPLASH

SPLASH

SHEESH!
ORDINARY
CELLS LIKE US
HAVE LIVES
AND FEELINGS,
TOO!

BUT
THEY
DON'T
CARE!



G₅
GERMS?

....!!

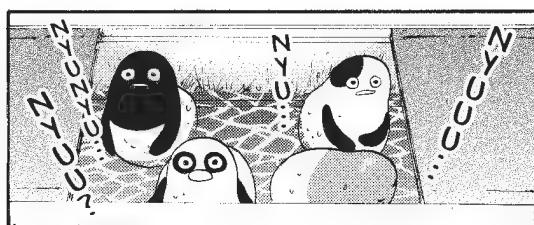
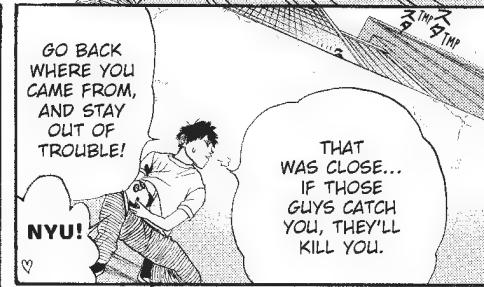


N Y U U U !



D-DON'T
GET CLINGY!
WHAT KIND
OF GERMS
ARE YOU?!



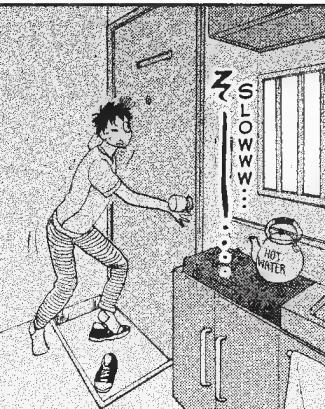




...I BROUGHT
THEM HOME
WITH ME...



...



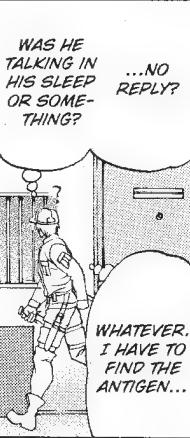


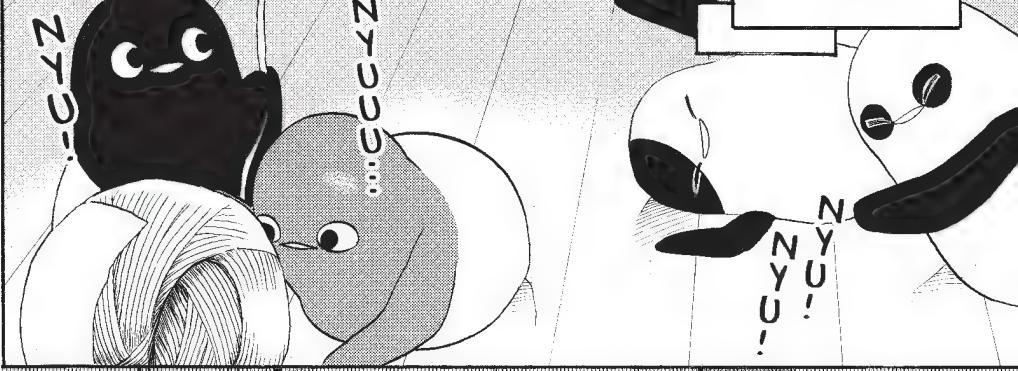
HE'S BEING HELD
BEHIND THE DOOR BY
THE ANTIGEN...
AND HE CAN'T CALL
FOR HELP, SO HE MADE
THAT NOISE OUT OF
DESPERATION...?!

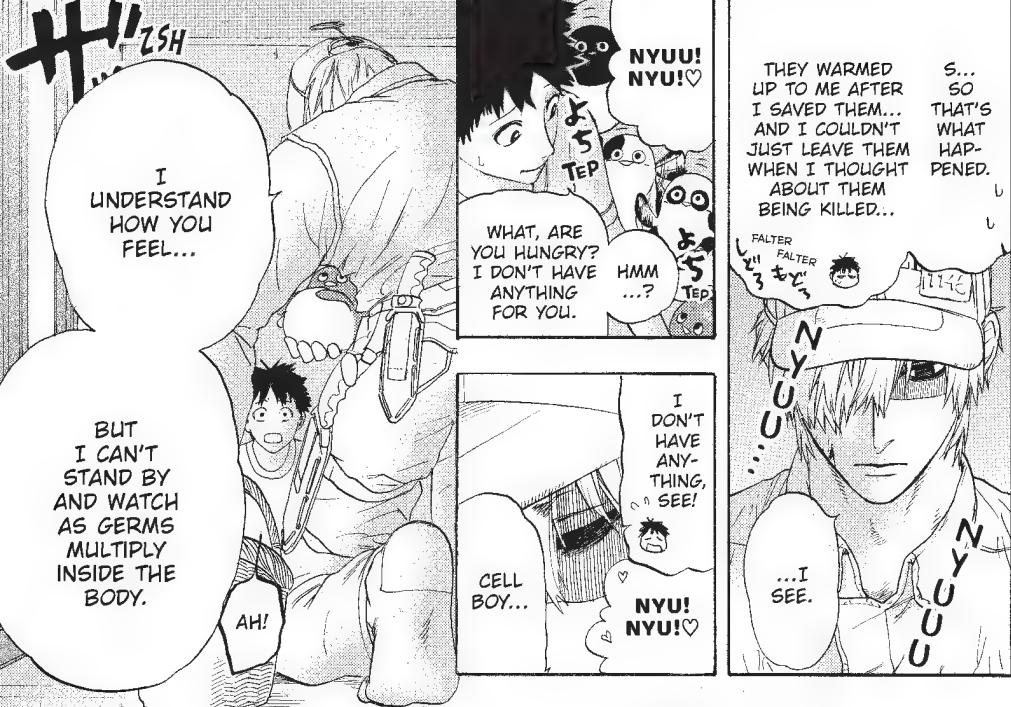
OH!



WAIT...
MAYBE—

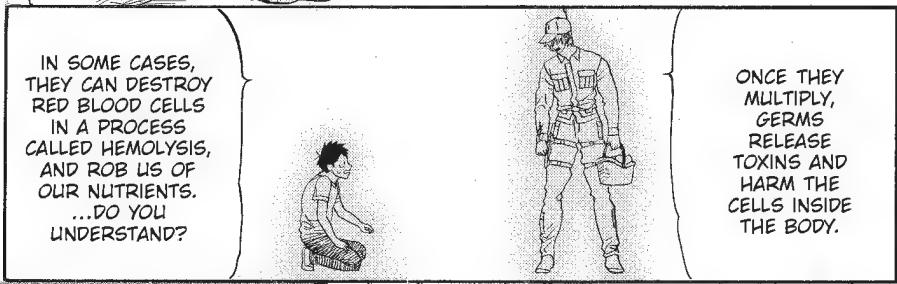






THEY WARMED UP TO ME AFTER I SAVED THEM... AND I COULDN'T JUST LEAVE THEM WHEN I THOUGHT ABOUT THEM BEING KILLED...

S... SO THAT'S WHAT HAPPENED.

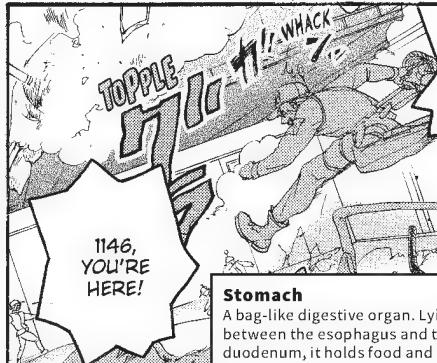




PY
LOR
- - -
!!!

PSHH

OVER
THERE...
BEYOND
THE
STOMACH
LINING!!



Stomach

A bag-like digestive organ. Lying between the esophagus and the duodenum, it holds food and digests it by secreting gastric juices.

A
G
H

THAT'S
RIGHT!
ABANDON
HOPE!!



HA
HA
HA
HA
HA!

SPLOOOSH!

WE H. PYLORI
HAVE HARDY
BODIES THAT
ALLOW US TO
OPERATE INSIDE
GASTRIC ACID!
UNLIKE YOU
WEAKLINGS!!

THERE'S
NOTHING
YOU CELLS
CAN DO TO
STOP ME!

H. Pylori
Helicobacter pylori. Resistant to gastric acid, they cause inflammation and ulcers, and on occasion, stomach cancer. Bacteria harmful to the human body.

THIS
ISN'T
GOOD...

AAUGH

H.
PYLORI...

RUMBLE



THIS
BODY IS
OURS
NOW!

BLOOD CELL

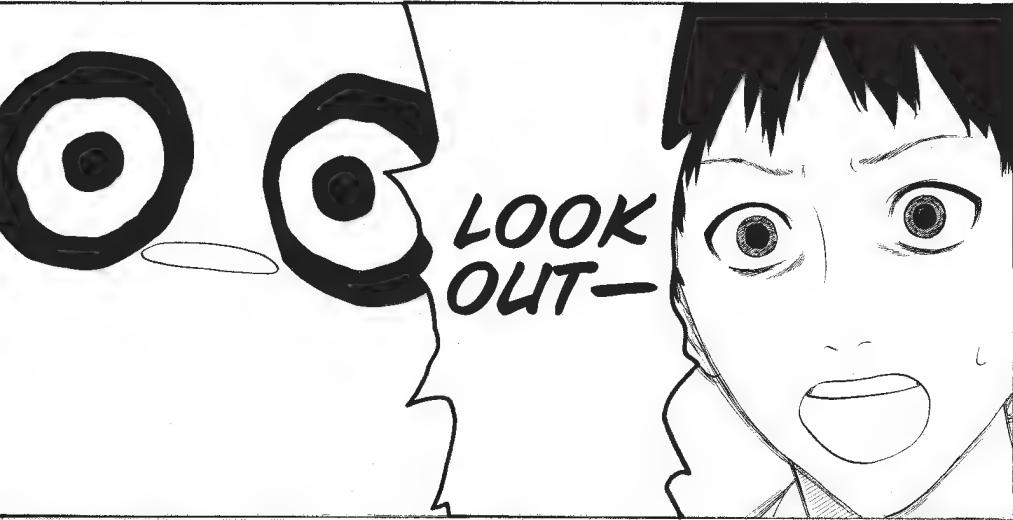
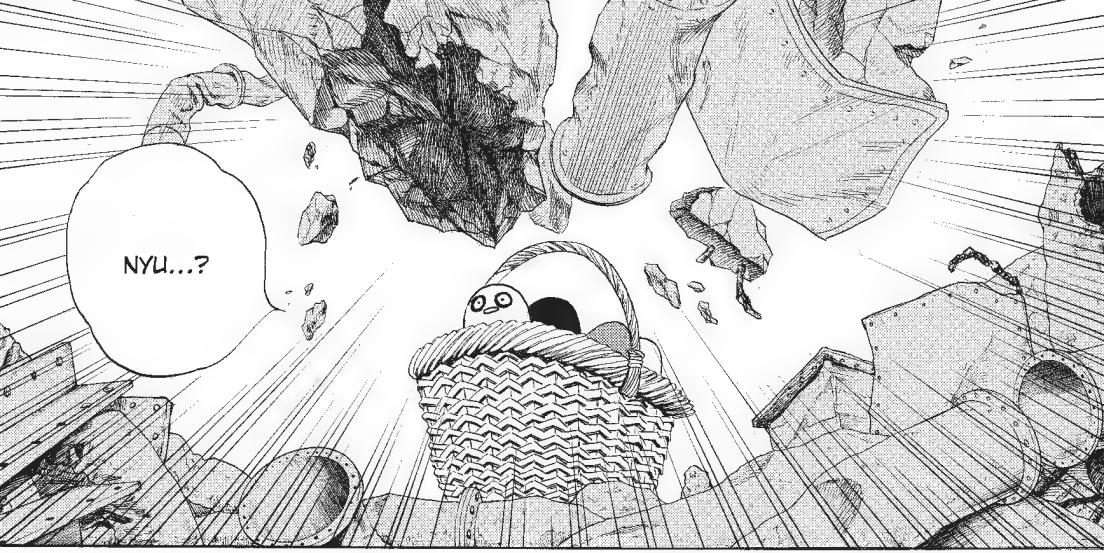
AT
LEAST
WEAR
THIS!

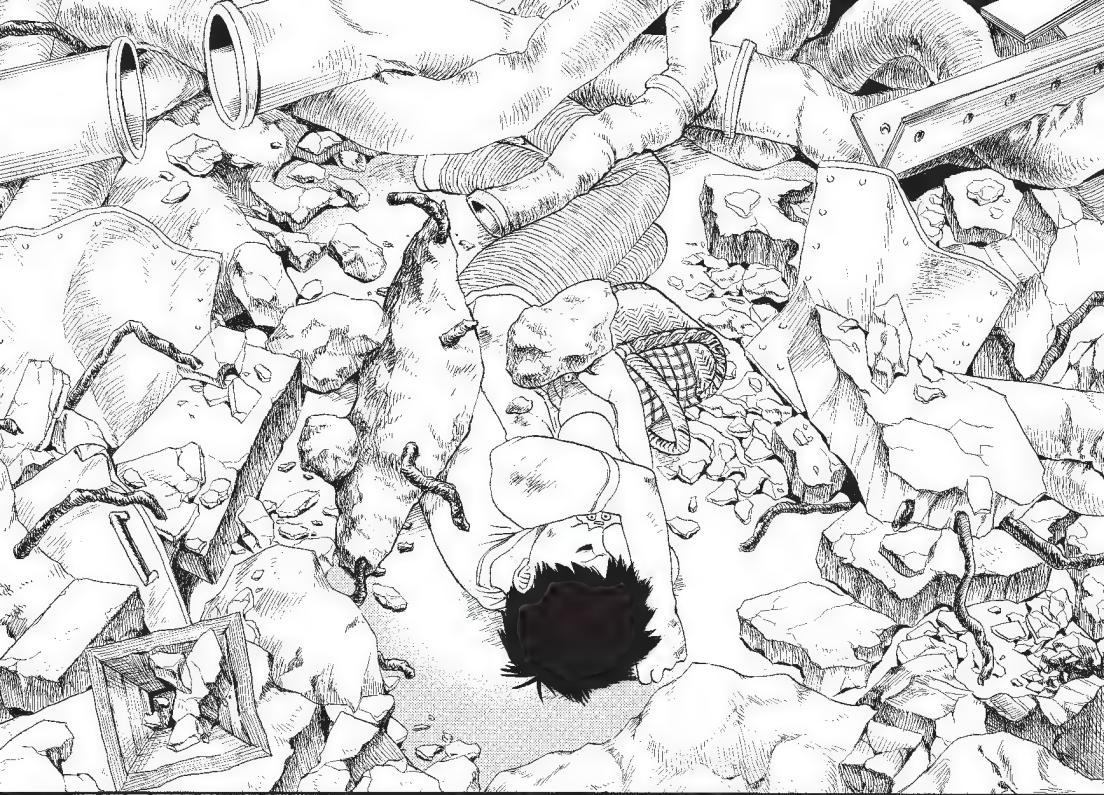
IT'S
MADE
OF
ACID-
RESIST-
ANT
ENAM-
EL !!

OH NO!
THE
STOMACH
LINING...

IT'S
BREAK-
ING
DOWN!

CRASH





C-CELL
BOY?!





I CAN'T...
PROTECT
YOU.

SORRY
GUYS. I'M
JUST A
REGULAR
CELL.

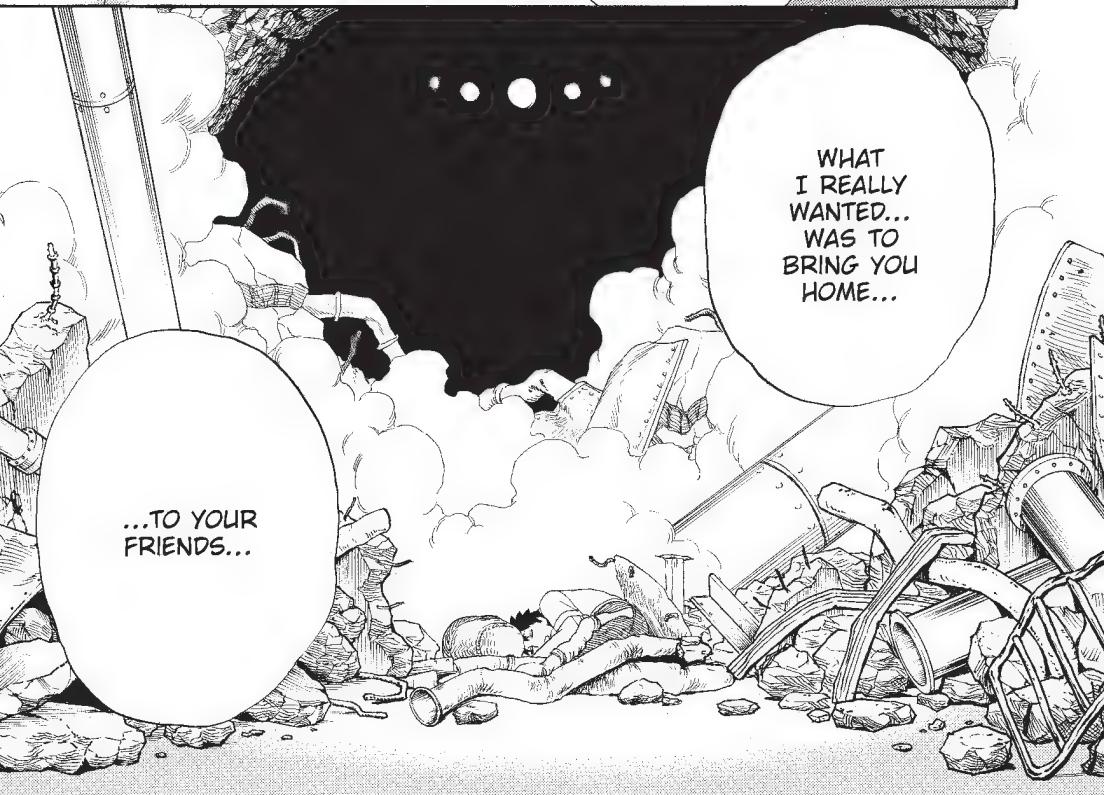
HA...
HA HA.



BUT JUST
REMEMBER...
THAT THERE
WAS AT LEAST
ONE GUY WHO
THOUGHT THE
WAY I DID...

AS LONG AS
YOU'RE IN THIS
BODY, GERMS
LIKE YOU ARE
GONNA BE
KILLED...

BUT...
I WANTED
TO HELP
YOU IF I
COULD...



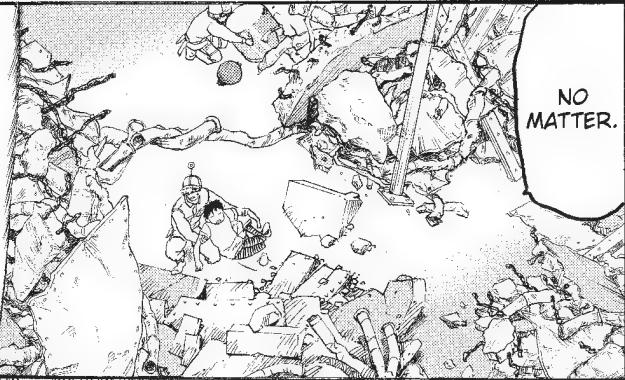
...TO YOUR
FRIENDS...

WHAT
I REALLY
WANTED...
WAS TO
BRING YOU
HOME...



I'LL
ANNIHILATE
YOU ALL.

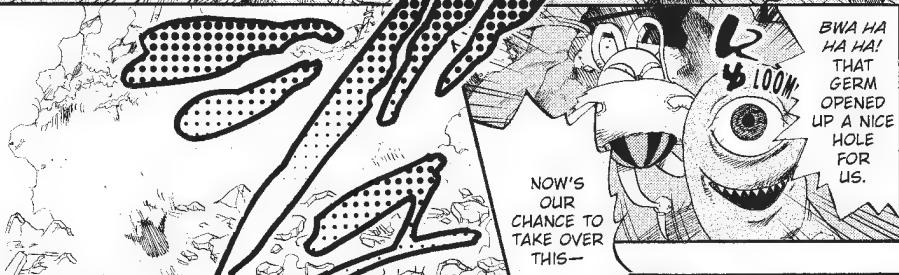
EN
FWIP ''

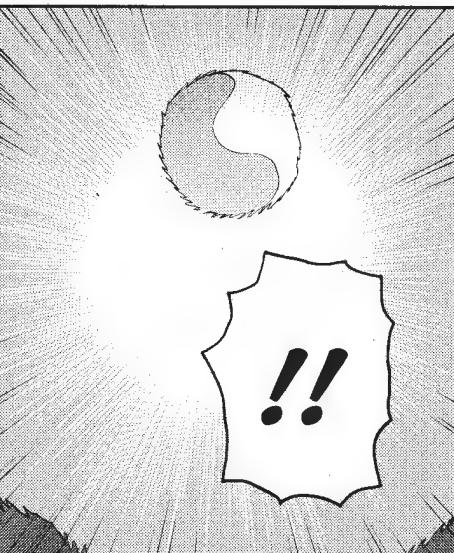
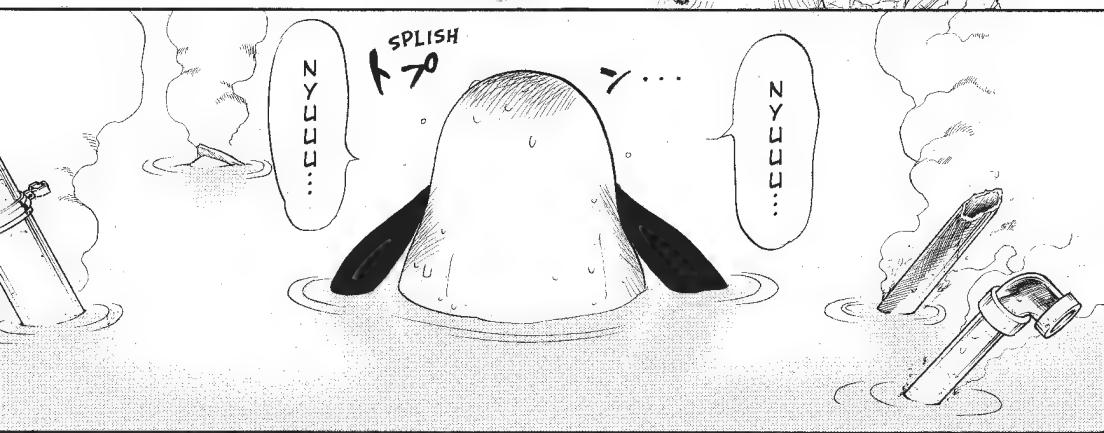


TAKE
THIS!

A FLOOD
OF
GASTRIC
ACID!!









NYUUUUU!

GIRL

AH

ZZZ

!!ZZZ!!

THAT
GERM'S
ATTACK
WORKED
ON THE
PYLORI?!

WHOA!

WH-
WHAT
HAPPENED
?!

A-ARE
YOU...

GASP!

PYLO

HOW DID
YOU HURT
ME...?

...

GUHHH...
THAT'S
IMPOSSIBLE

PYLO

NYUUUUU!

A LACTIC
ACID
BACTERIUM
?!

Lactic Acid Bacteria

A name not for a specific bacterial species, but a blanket term for bacteria that produce lactic acid in the course of breaking down sugars to live. The "nyuu" sound it makes in this comic comes from the Japanese term for lactic acid bacteria, "nyusankin."

GAAAAAH!
NO MORE!

WHAM

WHAM

WHAM

WHAM

WHAM

WHAM

NYU NYU
NYU NYU

OH NO!

GUH...
I CAN'T
TAKE ANY
MORE...

I HAVE
NO CHOICE
BUT TO
RETREAT...

Lactic Acid Production

Lactic acid is a metabolic byproduct of lactic acid bacteria. Because some bacteria are weak against lactic acid, it can kill them or slow their reproduction.

LEAD

...FROM
THAT
SEA OF
ACID.

YOU
FINALLY
CAME
OUT...

NYUU!

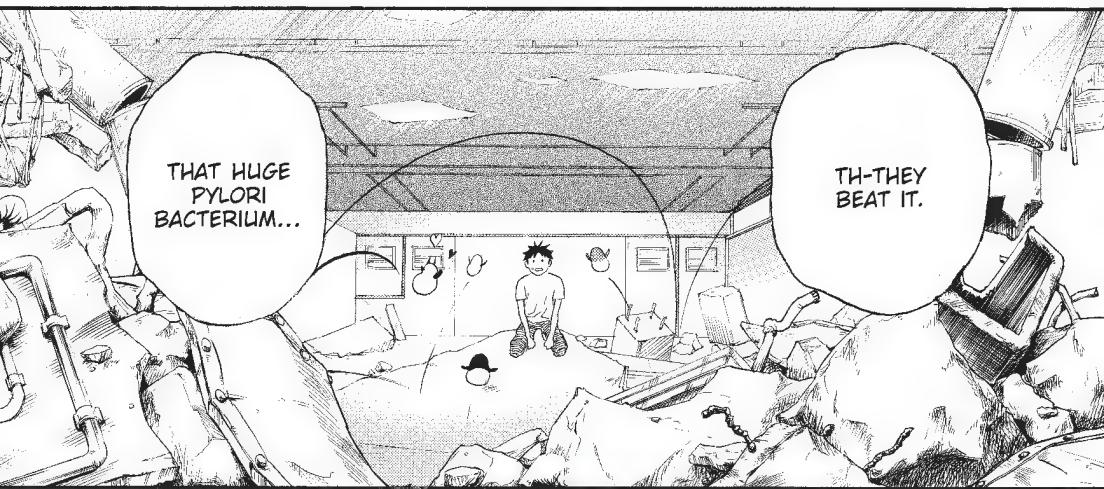
OH SHOOT,
OH SHOOT,
OH—

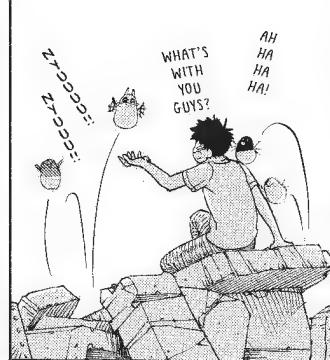
DIE, YOU
"PYLO"-ING
SCUM!

WHITE
BLOOD CELL

SMASH

PYLOR!!!





HEY,
CELL
BOY.



I JUST
REALIZED...





**GERMS
THAT
WORK
FOR THE
BODY.**

Good Bacteria

A blanket term for bacteria that live in the digestive system and are beneficial to the human body. Lactic acid bacteria and bifidobacteria are the most well-known. Some lactic acid bacteria are resistant to gastric acid and can suppress the activity of *H. pylori*.

FW

O

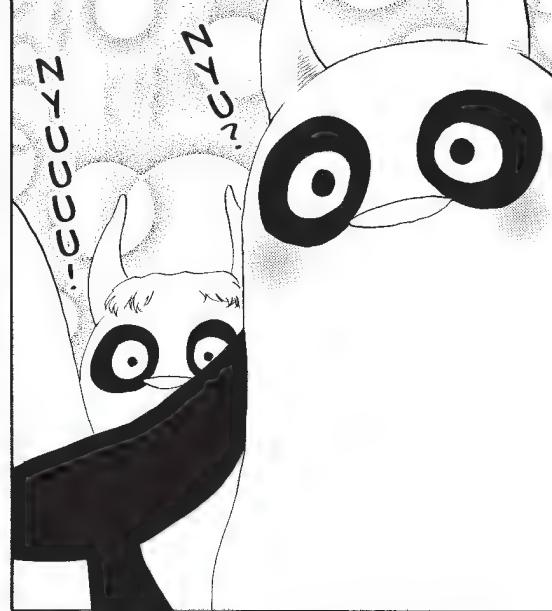
OO

P

V

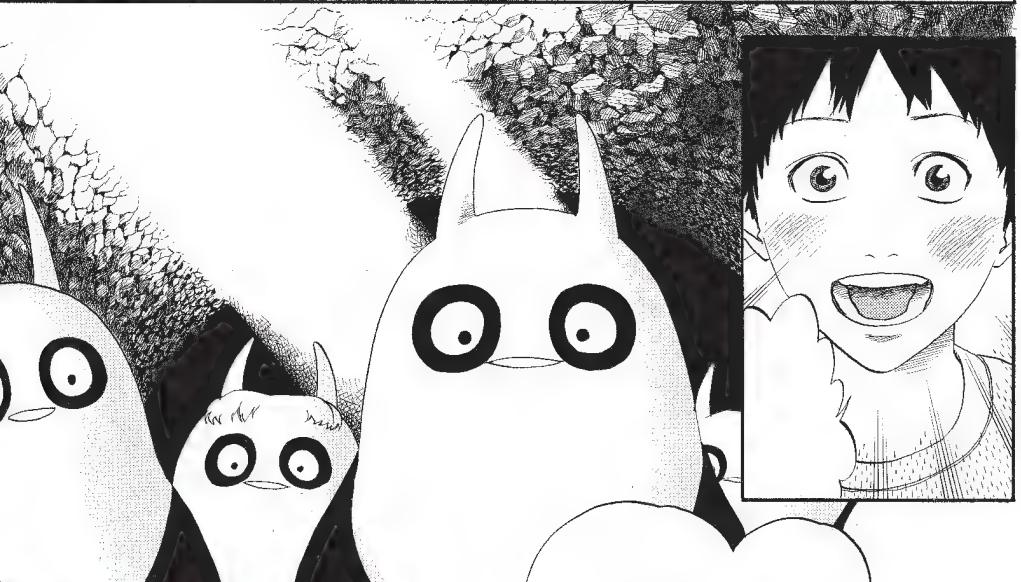
THEY'RE
GOOD
BACTERIA.

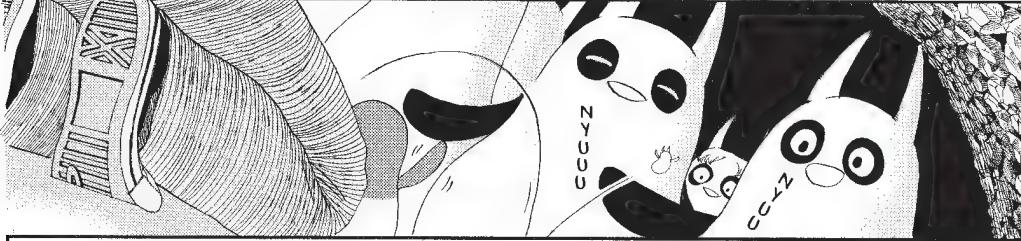
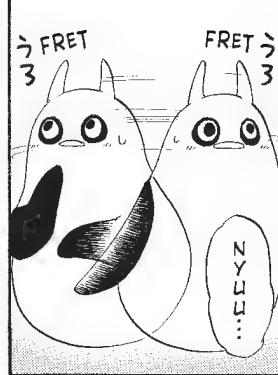




OTHER
GERMS
MIGHT COME
IN THROUGH
THAT HOLE
THE PYLORI
OPENED.





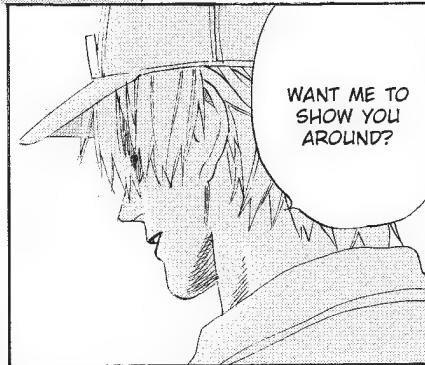


...AND THEY WORK WITH THEIR FRIENDS IN VARIOUS DIGESTIVE ORGANS.

BUT THERE ARE SEVERAL KINDS OF LACTIC ACID BACTERIA...

BY THE WAY, CELL BOY... THIS MAY OR MAY NOT CONCERN YOU...

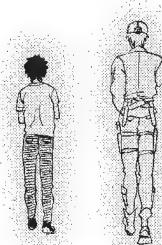
HMM?



HUH?
UH, A
LITTLE.
AH HA
HA HA.

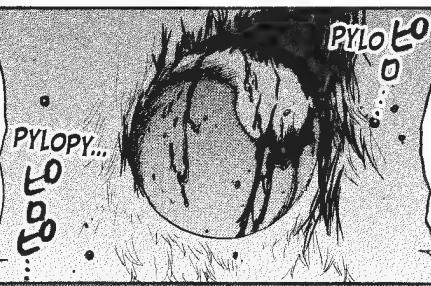
BY THE WAY... HAVE YOU GAINED SOME WEIGHT SINCE THE LAST TIME WE MET?

HEH
HEH...



...HEH...

BUT THOSE
ARE PLACES
OF CHAOS
THAT TOUCH
THE OUTSIDE
WORLD...
TEEMING WITH
BACTERIA
AND VIRUSES...
HEH HEH...



SO YOU
MEAN TO
DELIVER
THEM TO THE
DIGESTIVE
ORGANS
ALIVE...

...YOUR SELF-
RIGHTEOUS
HYPOCRISY...

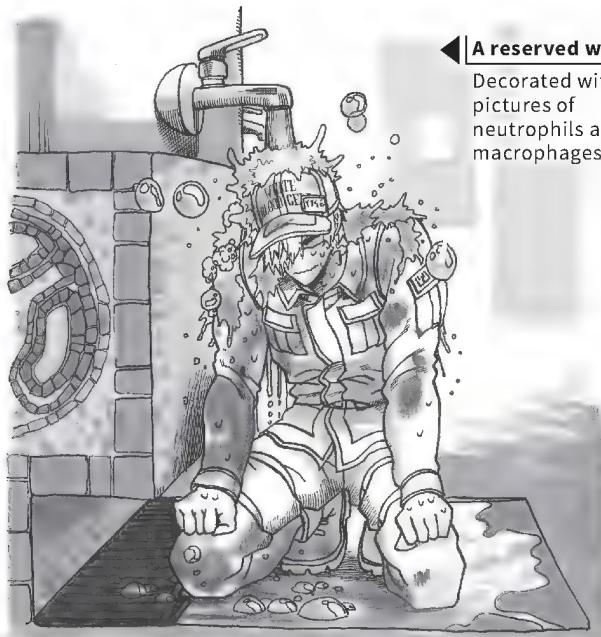
MAY
YOU CELLS
SUFFER
AND
REGRET...

CHAPTER 20: END

CLOTHES

The Life and Work of White Blood Cell (Neutrophil): What He Wears

* These are depictions created just for this comic, and differ from scientific fact.



A reserved wash station

Decorated with
pictures of
neutrophils and
macrophages

Clothes dirtied in a fight can be rinsed quickly with
disinfectants and soap water. (No hot water. Cold.)



If they rip, new clothes can be retrieved at
organs that work to make or store blood cells,
like the red bone marrow, liver, or spleen.

Cells at Work!

細胞

Small Intestine

A digestive organ consisting of the duodenum, jejunum and the ileum. Over 20 feet in length. The inner surface is covered with small protrusions called villi, which work to absorb nutrients.

CHAPTER 21: ANTIGENIC SHIFT

IT'S SO NICE
TO GET A WIDE
RANGE OF
NUTRIENTS!

LOTS OF
DIFFERENT
STUFF AGAIN
TODAY.

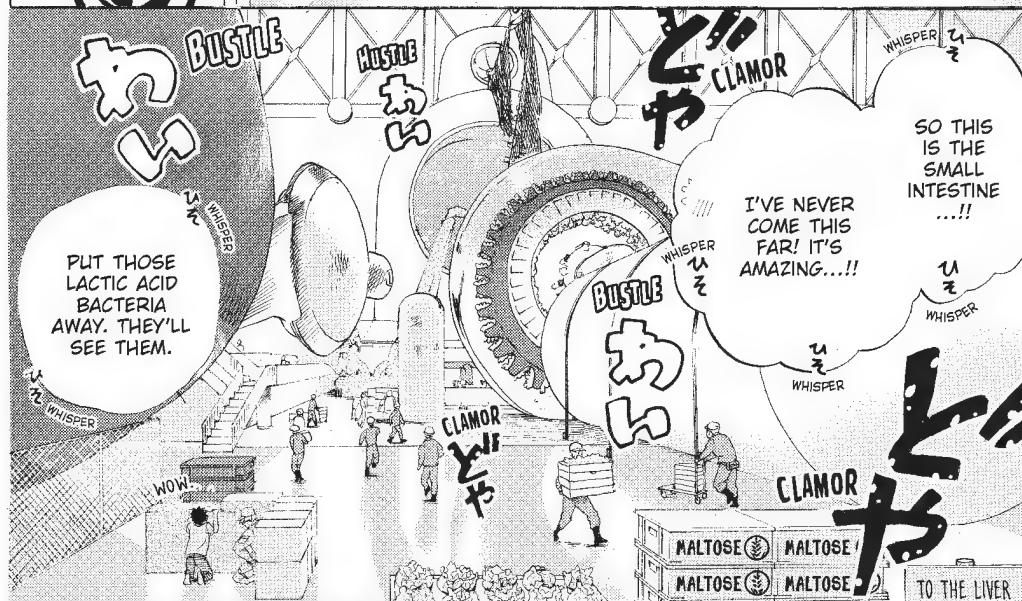
ALL RIGHT,
BRING UP THE
HALL FROM
VILLI NUMBERS
1 THROUGH 10!

BUSTLE



White Blood Cell (Neutrophil)

His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.



HUH...

THOSE NETS ARE CALLED MICROVILLI. THEY INCREASE SURFACE AREA SO THE BODY CAN ABSORB MORE NUTRIENTS.

GLORP GLORP

YOU'RE
RIGHT!
THAT'S
THE FOOD
WE EAT!!

-13
HOT BOI

HOT 13

FOR TASTING

AND THEN
THE ABSORBED
LACTOSE,
MALTOSA, AND
THE REST
GET BROKEN
DOWN AND
MADE INTO—
SEE?

ALTHOUGH
I DO HEAR
ABOUT SOME
THAT CAUSE
PROBLEMS...

MOST
OF THEM GET
KILLED BY
THE GASTRIC
ACIDS.

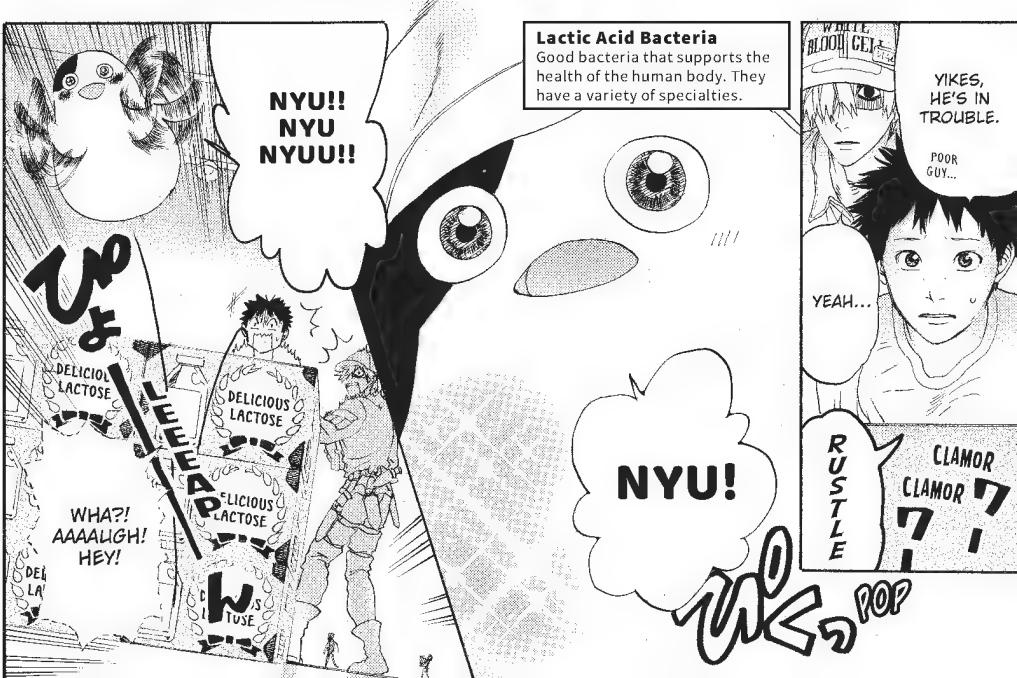
HUH...
BUT DON'T
ALL SORTS OF
STUFF COME
IN FROM THE
OUTSIDE?
LIKE
VIRUSES.

WHOA,
WHAT'S
THIS?!

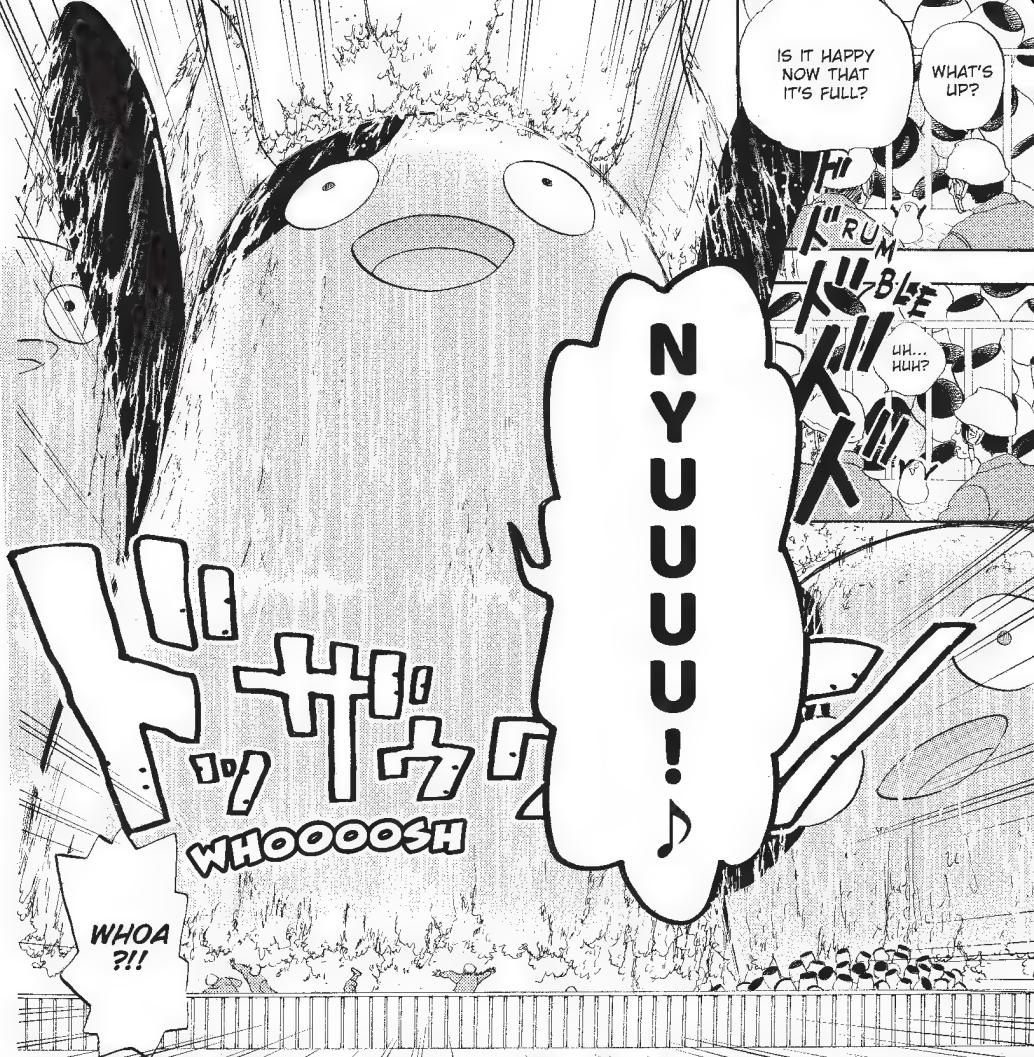
DOES BAD
STUFF EVER
GET ABSORBED
BY MISTAKE?

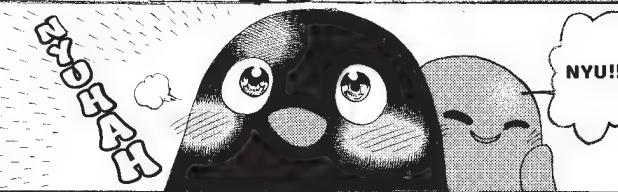
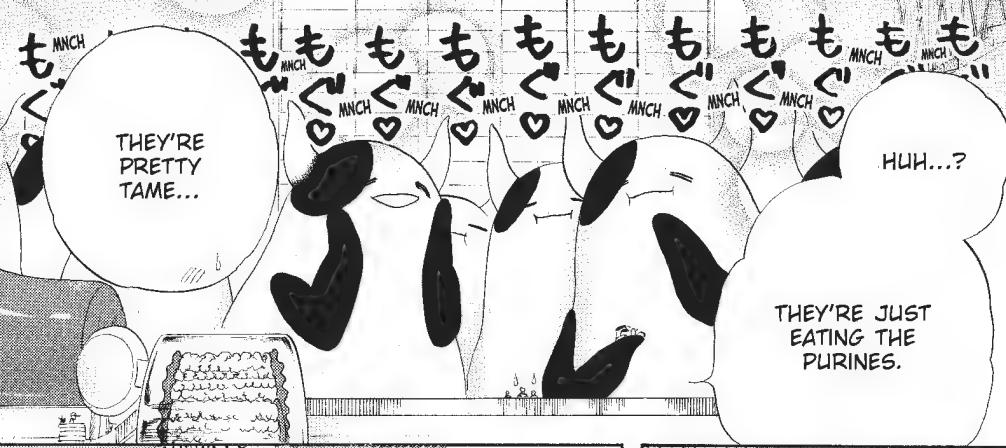
HARD
HARD
HARD
HARD

*NOTE: THE TERM "PURINES" RESEMBLES THE JAPANESE WORD FOR "PUDDING, HENCE THEIR PUDDING-CUP APPEARANCE HERE.









I SEE...
SO THIS IS
THAT ONE'S
SPECIALTY.

The work of lactic acid bacteria

The work of lactic acid bacteria
Some lactic acid bacteria break down purines into a form that's less absorbable by humans, and ingest it into their own bodies as nutrients.



YEAH,
DEPENDING
ON THE
VARIETY, THEY
DO DIFFERENT
THINGS TO LIVE
ALONGSIDE THE
CELLS OF THE
BODY.

THEY'RE
AMAZING...

HUH. THEY
CAN DO
THINGS LIKE
THIS, TOO!

LACTIC ACID
BACTERIA...
THEY CAN MAKE
FRIENDS WITH
ANYONE...

BYE-BYE!

NYU
NYU!

...YEAH.

MAYBE
THE SMALL
INTESTINE
WILL BE A
COMFORTABLE
PLACE FOR
THAT ONE.

NYUUU!
NYU?

HEEE!
...HEY!

TAKE
CARE...

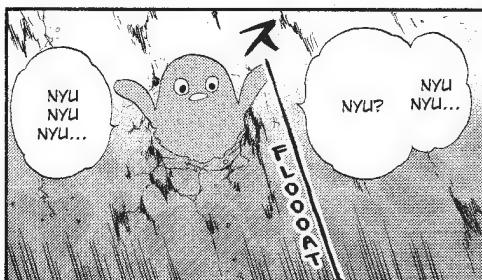
CUUU
N
CUCCYNN



THEY'RE
JUST
AMAZING!

WOW!
LACTIC ACID
BACTERIA
REALLY DO
HELP THE
BODY!

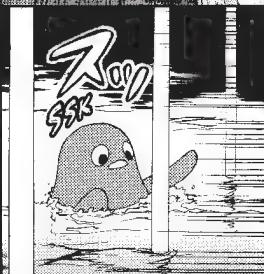




NYUUUU!

FWOOSH

THE
LACTIC ACID
BACTERIUM
?!



LACTIC
ACID
BACTERIUM!!

FWOÖ

OOSH

IT GOT
WASHED
AWAY!!

S-
SORRY,
BUT I
CAN'T
DO
THAT!

GLUH
...?!

WHOOOSH

PANT!

WHAT?!

I KNOW! YOU
CAN CONTACT
THE OTHER
IMMUNE CELLS
RIGHT AWAY!
TELL THEM NOT
TO KILL IT!

WE
HAVE TO
FIND IT!

WHAT DO
WE DO...?
IT WON'T
MAKE IT ON
ITS OWN.

ALL WE CAN DO
IS HOPE THAT
IT GETS FOUND
BY AN IMMUNE
CELL WHO CAN
TELL IT'S A GOOD
BACTERIA...

WE NEUTROPHILS
DON'T
HAVE ANTIGEN-
PRESENTATION
ABILITY.

NO
WAY
...

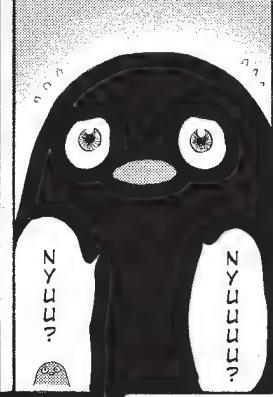
BUT IF
IT'S DEALT WITH
AS A FOREIGN
SUBSTANCE...
I CAN'T STOP IT...
I'M SORRY...

WE CAN'T
COMMUNICATE TO
OTHER IMMUNE
CELLS NOT TO
ATTACK A GERM
BECAUSE IT'S ONE
OF THE GOOD
ONES...

SPLASH

SPLASH

BUT...THE
BODY IS SO
LARGE. WE
HAVE NO IDEA
WHERE IT'LL
END UP.



NK Cell (Natural Killer Cell)

Patrols the whole body and attacks cancerous and virus-infected cells.

**NK
CELL!**

THAT'S A
FRUSTRATING
THING TO
HAVE TO
HEAR...



JUST
WHEN
I'M SO
HARD AT
WORK...

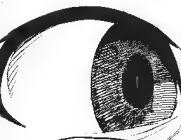
UH...
UM...

IT'S
BEEN A
WHILE.

IF IT WEREN'T FOR US IMMUNE CELLS, ALL YOU REGULAR CELLS WOULD ALREADY BE DEAD.

POKE

DO YOU NEED ME TO SPELL IT OUT FOR YOU?



SO YOU WATCH WHAT YOU SAY AND DO, LITTLE CELL...♡

A LYMPHOCYTE THAT CAN KILL WHATEVER CELLS I WANT AT MY OWN DISCRETION.

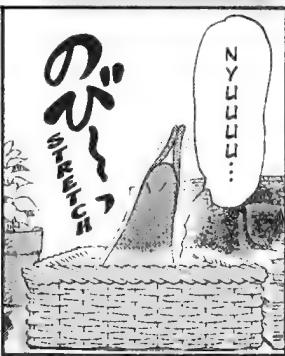
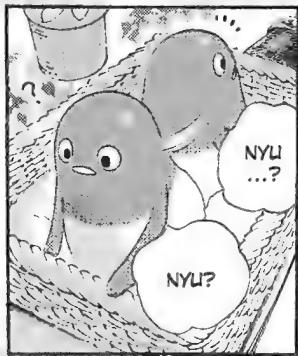
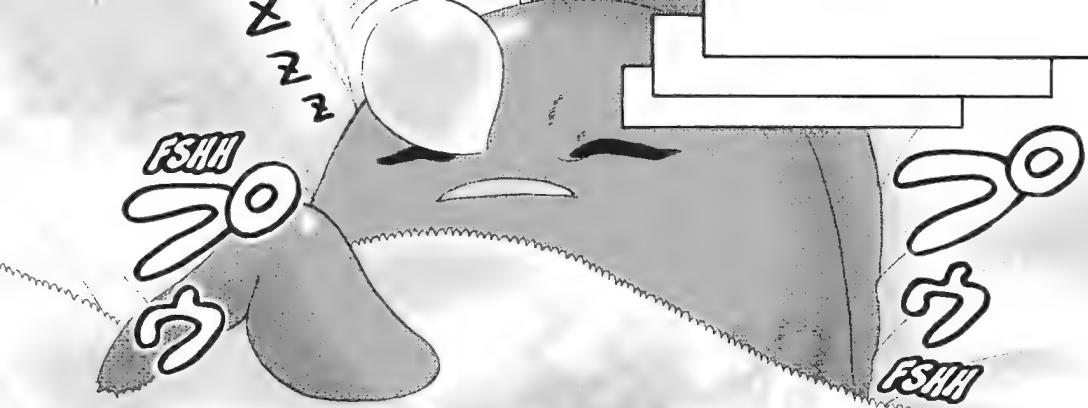
I'M AN NK CELL.

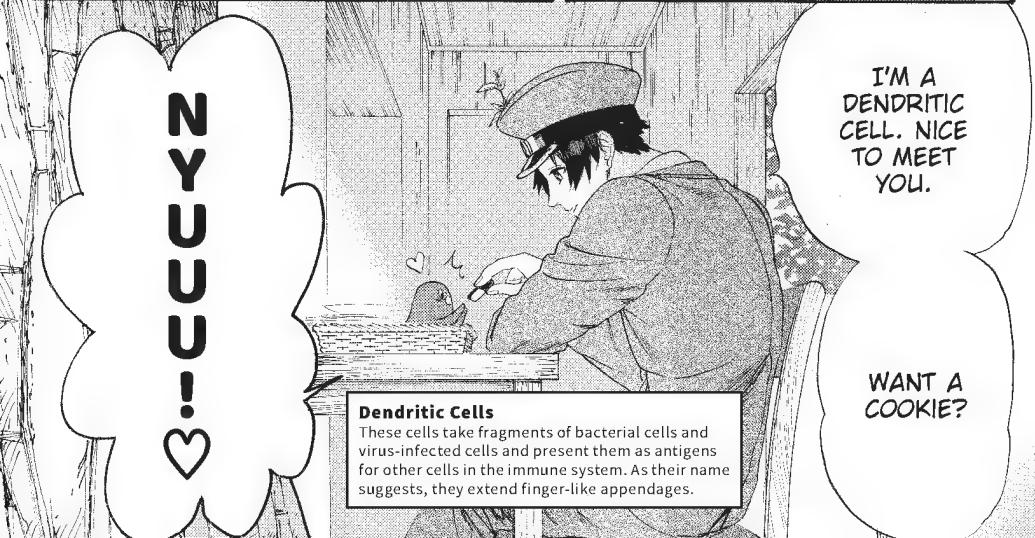
LACTIC ACID BACTERIA, PLEASE BE SAFE!!!

AND WHAT'S YOUR PROBLEM? CHUMMING IT UP WITH A REGULAR CELL.

NK, THAT'S ENOUGH!

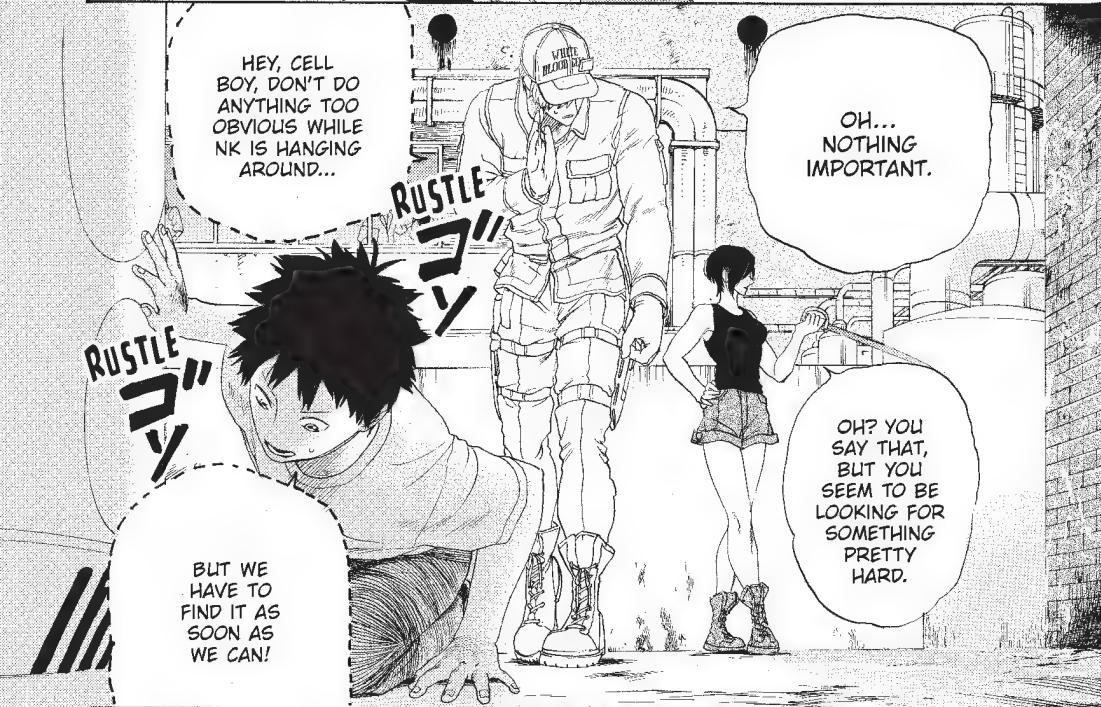
S-SHE'S SO VIOLENT!! ARE ALL IMMUNE CELLS LIKE HER?!





Dendritic Cells

These cells take fragments of bacterial cells and virus-infected cells and present them as antigens for other cells in the immune system. As their name suggests, they extend finger-like appendages.



THERE IS
A RISK OF
INFECTION.
IMMUNE CELLS
IN THE AREA ARE
TO REPORT
TO THE SITE
IMMEDIATELY!

AN INFLUENZA
VIRUS HAS BEEN
DETECTED NEAR
THE SMALL
INTESTINE!

!

I
FOUND
YOU!!!
LACTIC
ACID
BAC—

THAT RED
THING...

HMPH.
SMALL FRY.
AT A TIME
LIKE THIS.

OH...

I-IT'S A
VIRUS-
INFECTED
CELL!!!

HMPH!

Influenza Virus

The virus responsible for the infectious disease Influenza. Largely divided into Types A, B and C, it causes symptoms such as fever above 100° F, headache, and joint and muscle pain.



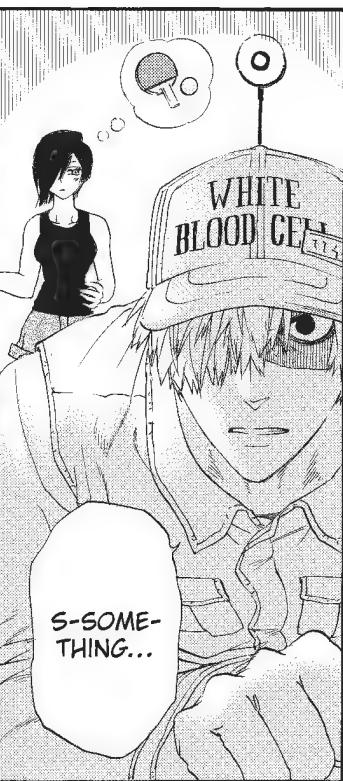


K-I-S-H-A-A-A-H!

GIRL

WHITE

RING





YOUR
REIN-
FORCE-
MENTS
ARE
HERE!





LOOK
AT ITS
HEAD!!

THE
SHAPE
OF THE
VIRUS IS
DIFFER-
ENT!!

POKE

SEE?!
THAT
SINISTER
POINTY
HEAD...!!

Antigen Shift in Influenza

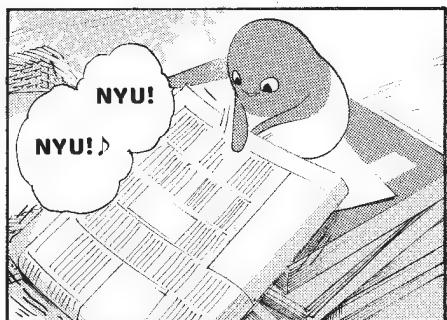
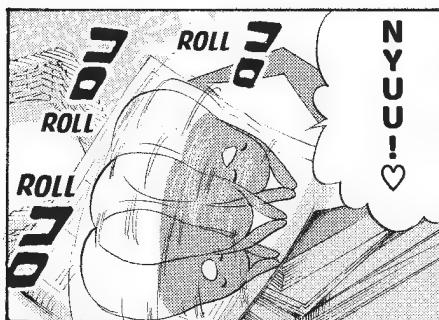
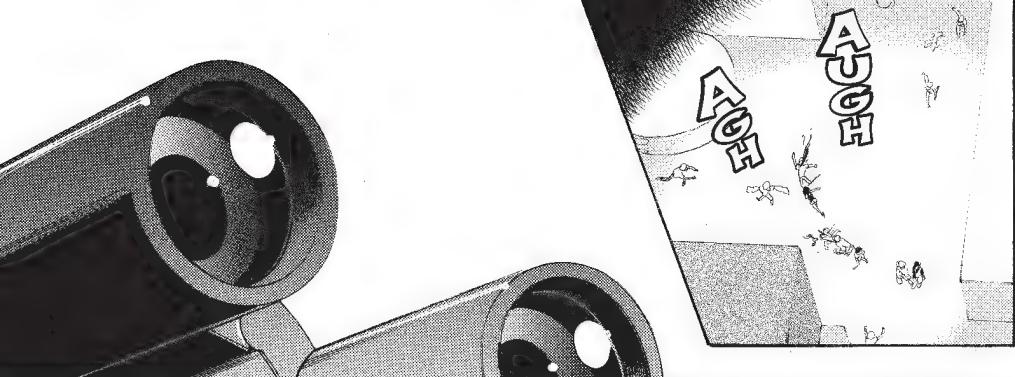
The influenza virus mutates easily, and the characteristics of the antigen change almost annually. Because of this, acquired immunity is sometimes insufficient to protect against it.

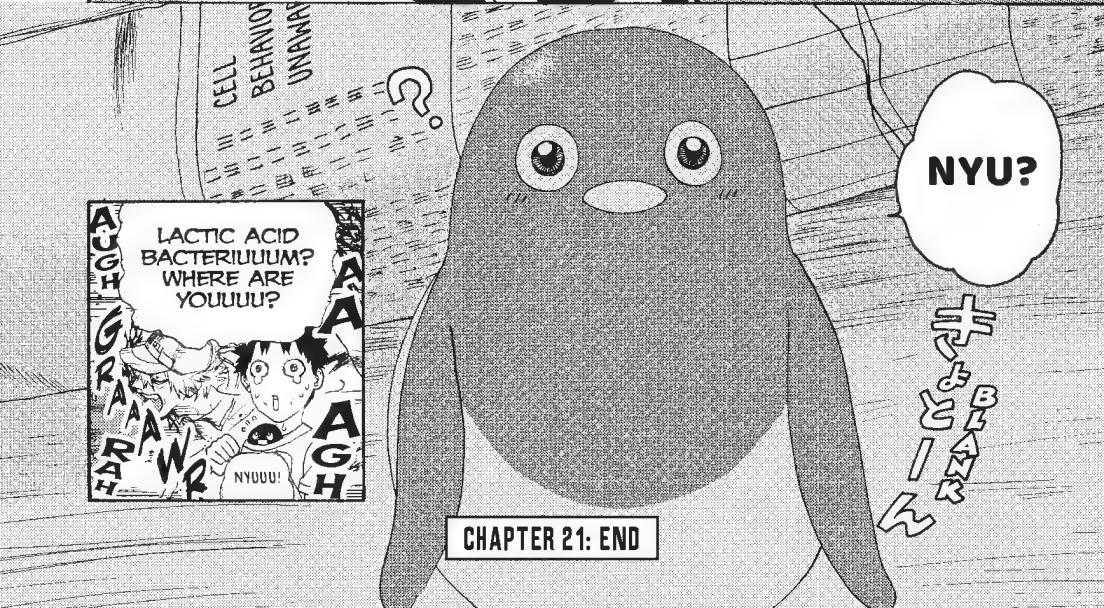
THIS
WORLD
IS DONE
FOR!!

OUR OLD
ATTACKS
WON'T
WORK
AGAINST
THEM!

FOR
REAL
...?

WHAT
...?





I'D LIKE
FOR YOU
TO DO A
LITTLE
FAVOR FOR
ME...☆

NYU?

LACTIC ACID
BACTERIUM?
WHERE ARE
YOUUUU?

CHAPTER 21: END

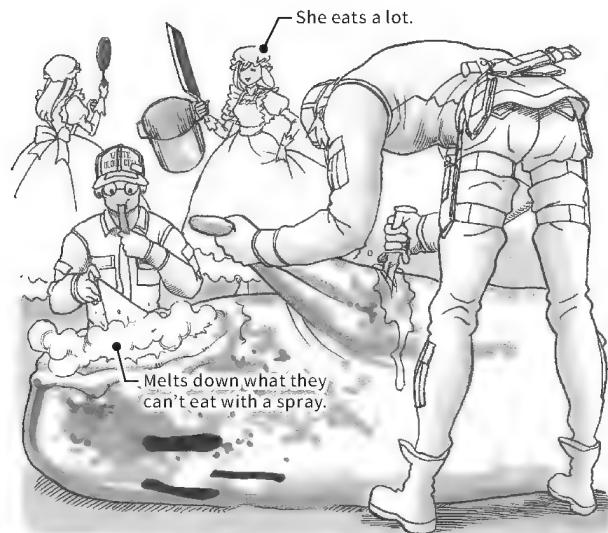


The Life and Work of White Blood Cell (Neutrophil): What He Eats

* These are depictions created just for this comic, and differ from scientific fact.



He eats bacteria and viruses for nutrients.



When there's more than he can eat, he gets help from the macrophages.

Cells at Work!

細胞

YES...
WE CAN FIGHT
OLD KINDS OF
THE VIRUS,
BUT ANTIGEN-
SHIFTED
STRAINS ARE
A DIFFERENT
STORY!



THE BODY
CATCHES
INFLUENZA ONCE
IN A WHILE,
DOESN'T IT...?
IS IT THAT BAD?

**White Blood Cell
(Neutrophil)**

His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.

BUT
LEAVING IT
ALONE MIGHT
TRIGGER A
SURGE IN
THE NUMBER
OF INFECTED
CELLS!

Influenza Virus

The virus responsible for the infectious disease Influenza. The characteristics of the antigen change almost every year.

WE
DON'T KNOW
ANYTHING
ABOUT THOSE.
WE HAVE NO
INFORMATION
AT ALL!

WHAT
ABOUT
THIS?!
TAKE
THAT!!

ACK! I
HAVE TO TRY
SOMETHING,
EVEN IF IT
MIGHT NOT
WORK...

B Cell (Antibody-producing Cell)

A type of lymphocyte that makes weapons called antibodies to fight antigens such as bacteria and viruses.

THERE'RE
TOO MANY
PEOPLE
IN THESE
ALLEYS!
LET'S FIGHT
IT IN A
PLAZA!

NO
GOOD!

SHAH!



OUT
OF THE
WAY,
CELL!

GLUH!
WHITE
BLOOD
CELL...

AUGH!!

CRASH



NK Cell (Natural Killer Cell)
Patrols the whole body and attacks cancerous and virus-infected cells.



WH-
WHAT?!

ROAR

WHIR

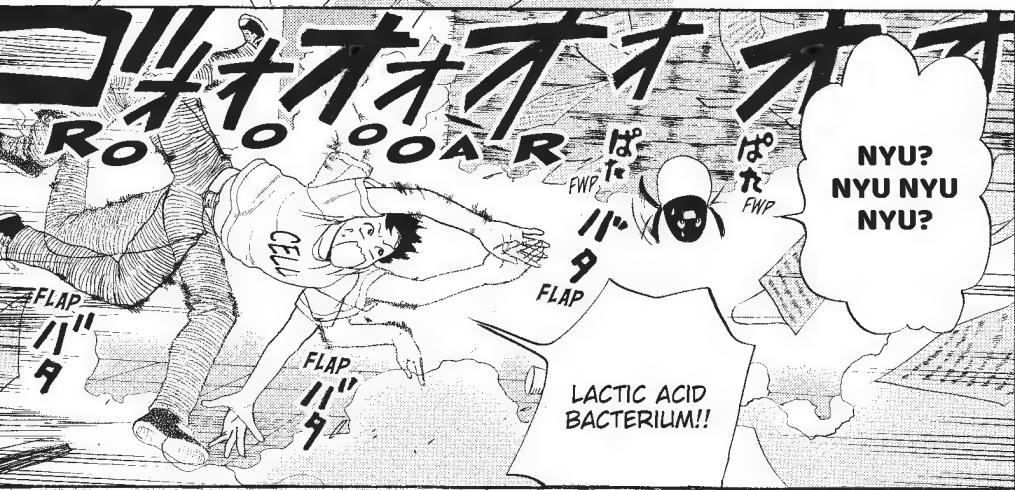
WIP

RRR
RRR
RRR

RRR

THEY'RE
CAUSING A
STOMACH-
ACHE!!!

CHAPTER 22: CYTOKINES



OW... WHAT
HAPPENED
TO THE
LACTIC ACID
BACTERIUM
...?

PROTECT
IT.

WHITE
BLOOD
CELL!

YOU
GRABBED
IT!

SHAAA!
SHA
SHA
SHA!

ROOOAR

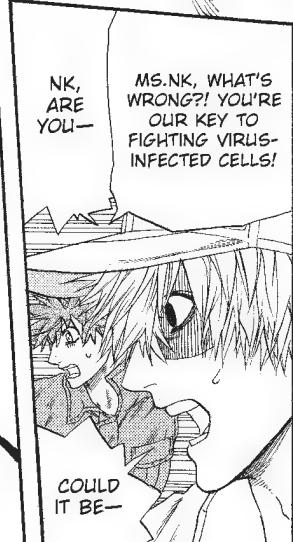
KISHAAA!
SHA
SHA SHA!

NK! YOU
CAN'T
FIGHT
IT UP
CLOSE!
GET
AWAY
FROM
IT!!

LIGH...

...KILL...
THESE
SCUM...
GAH.

WHY...
CAN'T
I...



H-HOLD
ON,
MS. NK,
YOU
CAN'T-

WHO'S
GOING
TO STOP
THESE
GUYS?!!

NK!
SNAP
OUT OF
IT!

I
CAN'T...

WHAT
AM I
DOING
...?
JUST...
CAN'T
ANY-
MORE...

Eo
FLICK

NK!! DON'T
STOP BELIEVING
IN YOURSELF!
WE'RE PROS!
WE'VE TRAINED
FOR THIS!

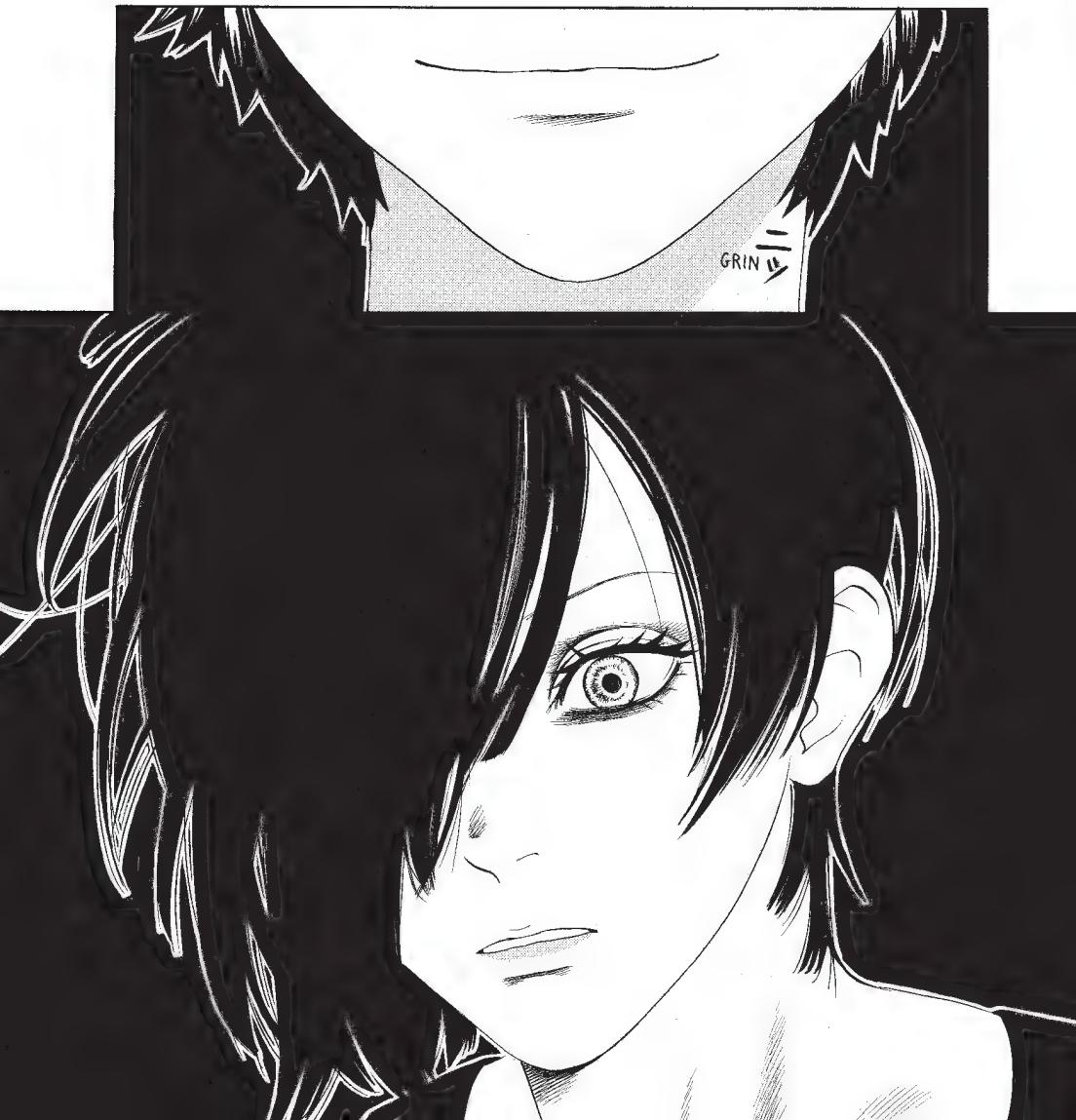
BWOOOSH

IF WE WORK
TOGETHER, WE
CAN DEFEAT ANY
ENEMY!! PUT YOUR
HEART INTO IT!!
GET UP!! GET UP
AND RUN!!

...HM?

I DIDN'T
KNOW!
SORRY NK!!
AND THANK
YOU!!

EARLIER...
I STOOD UP
FOR YOU,
NEUTROPHIL,
BECAUSE
PEOPLE
WERE
ON YOUR
CASE...
BUT YOU
JUST GOT
MAD AT
ME...





**G
Y
A
A
H
!!**





WHO HAD
THAT
PICTURE...?!

HIT
SMASH



HEH
HEH
HEH...

BUT
HOW...?!

NK! DID YOU
BECOME
ACTIVATED?!

コラオオオオオオオオ
BW オオオオオオ
SH

THANKS TO THESE
POLYSACCHARIDES
YOU MADE—

MMM...
THANK YOU
SO MUCH,
LACTIC ACID
BACTERIUM.

NYU?

HEH
HEH...

EXCUSE
ME.

SNAP

ヰ

IT'S
BEEN A
LONG
TIME...

NYU!
NYU!
GROW
GROW

SWISH

ヰ



...SINCE
I'VE BEEN
ACTIVATED!

Dendritic Cells

These cells take fragments of bacterial cells and virus-infected cells, and present them as antigens for other cells in the immune system.



HEY, THAT
TORNADO'S
CLOSING IN!
LET'S GET OUT
OF HERE!!

DENDRITIC
CELL?! WHY
ARE YOU
DRESSED LIKE
THAT...?



The work of lactic acid bacteria

Some lactic acid bacteria produce polysaccharides that help regulate the immune system. These immunomodulatory polysaccharides are thought to activate dendritic cells.

...IS REALLY
STRONG!



TAKE A LOOK
AT THOSE
PICTURES
THAT I JUST
TOSSED YOU.





PLEASE SEE
HOW YOU WERE
WHEN YOU WERE
YOUNGER, AND RECALL
YOUR ENERGY AND
ENTHUSIASM OF
THOSE DAYS.

POP

FLUSH TIG ZAP ZAP



BUT...YOU
WORK BETTER
UNDER THESE
CIRCUMSTANCES,
DON'T YOU? WE
HAVE THE DATA
TO PROVE IT.

HICUP!

NO, I'D
RATHER NOT
HAVE TO DO
ANYTHING SO
DRASTIC.

THEN
DON'T
DO IT!

CYTOKINES

IL - 12

CYTOKINES

AND
WORK
HARDER
THAN
USUAL!♥

SO LET ME
LEAD BY
EXAMPLE...
HEH HEH!♥

Cytokines
A blanket term for
proteins that affect
specific types of cells.

I'M
ALREADY
ACTIVATED!
HOLD
ON-

I'LL WORK AS
HARD AS I CAN!
YOU DON'T HAVE
TO DO THIS!!

DENDRITIC
CELL,
WAIT! NO
MORE—

OKAY,
EVERYBODY!

Boosting Immunity

The activation of dendritic cells is thought to increase the activity of NK cells and the production of antibodies against certain viruses by producing cytokines.

**LET'S GET
ACTIVATED!**



GYAAAHH!!

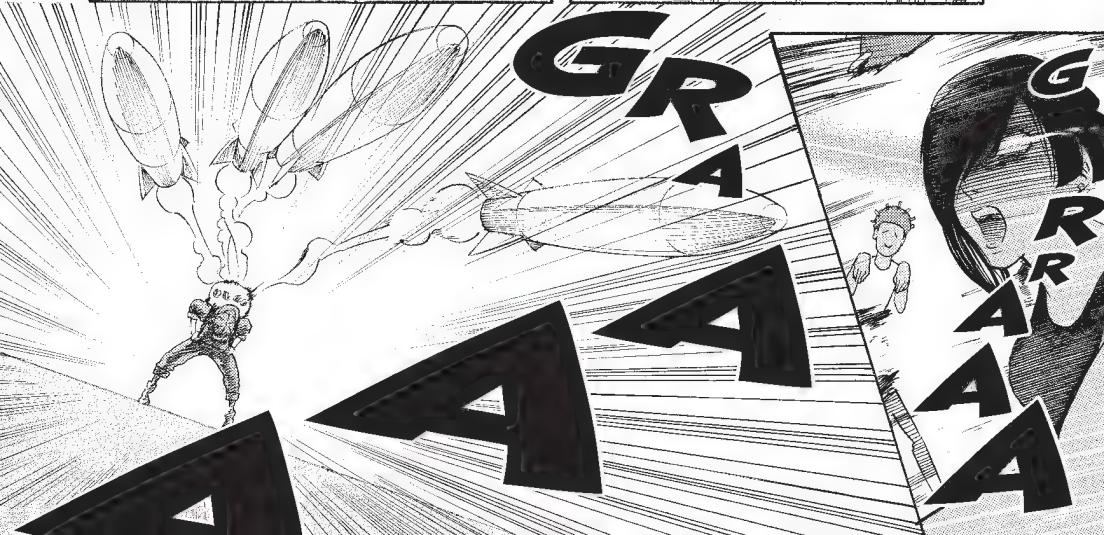
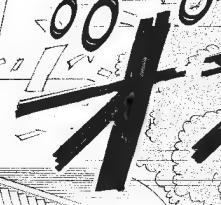
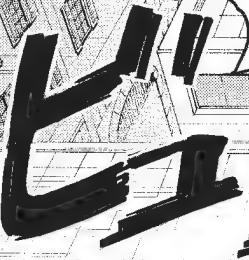
NOOOO!!

STOP!!

TH-THIS
CAN'T BE ME.
WHO'S THIS
GUY IN THE
PICTURE WHO
LOOKS JUST
LIKE ME...?!

BWOO

OOOSH



GRRRAAAARR

SMASH

SMASH

KABOOM

BOOM

BOOM

BAM BAM

BAM

BAM BAM



NYU NYUUUN!

WHOA...
FRIENDS!

RUMBLE
RUMBLE

RUMBLE

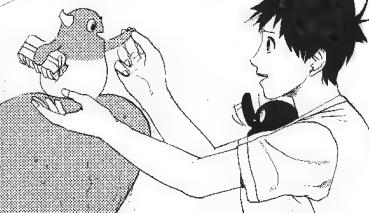
NYU...

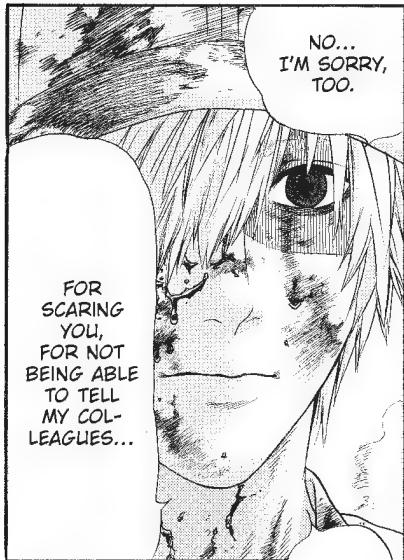
I WISH
WE COULD
HAVE SPENT
MORE TIME
TOGETHER...

...BUT
THIS IS
GOOD-
BYE.

NYU
NYU!

TAKE CARE OF
YOURSELF...!!









IT'LL DOUBLE AS A WARNING.

FINE. IT'S NOT LIKE IT DOESN'T CONCERN YOU, TOO, SO I'LL TELL YOU.

WHAT?

...NO MATTER WHAT IT IS.

NEUTROPHIL, YOU SHOULD KILL THE ENEMY WITHOUT A SECOND THOUGHT...

YES...

AND YOU ALSO KNOW THAT WITH THAT INFORMATION, CELLS CAN BE "COPIED."

YOU KNOW THAT THE INFORMATION ON THE CELLS WE KILL ARE STORED AS ANTIGENS, RIGHT?

ALONG WITH THE GENETIC INFORMATION RECORDED WITH IT.

THE ANTIBODY INFORMATION OF A CERTAIN CELL WAS LEAKED.

WHAT?!

THAT CELL HAS ALREADY ACQUIRED A PHYSICAL FORM, SOMEWHERE IN THIS BODY.

RUMBLE

....!

REMEMBER?
THE GUY WHO
SWORE HE'D
COME BACK
TO LIFE AND
KILL YOU.

THAT'S
WHO I'M
LOOKING
FOR.

HEH...

HEH HEH
HEH...

IT'S
SO NICE
TO HAVE
MY OWN
BODY.

IS
THAT
SO?

AT
LAST...!!

HEH HEH...
AT LAST,
I'LL FINALLY
MEET YOU...

THIS'LL
BE SO
MUCH
FUN.

CHAPTER 22: END

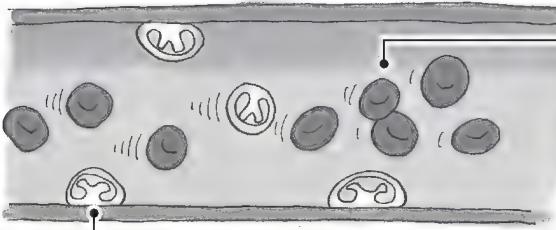
RESIDENCE

The Life and Work of White Blood Cell (Neutrophil): Where He Lives

* These are depictions created just for this comic, and differ from scientific fact.

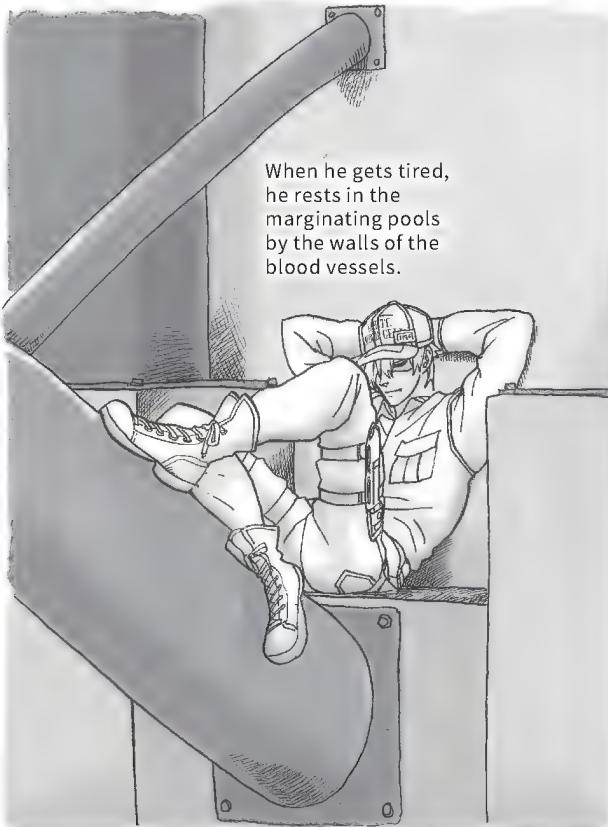
Even though neutrophils patrol the body at all hours, there are places where they can rest. They live in the circulating and marginating pools in the blood vessels.

Marginating pools stick to the vessel walls or flow slowly.



Circulating pools flow in the middle of the blood vessel.

When he gets tired, he rests in the marginating pools by the walls of the blood vessels.



Cells at Work!

細胞



**White Blood Cell
(Neutrophil)**
His main job is to destroy
foreign substances that enter
the body from the outside,
such as bacteria and viruses.

CHAPTER 23: HARMFUL BACTERIA



KEEP THE
INTESTINES CLEAN

THIS IS
THE LARGE
INTESTINE.

A R R H

WHITE
WELL

" "

オロシ
オロシ
B
W
H
SO
SH





Large Intestine

An organ that absorbs water and minerals to make feces. Performs the final stages of digestion. About 5 feet in length, the large intestine is divided into the cecum, colon, and rectum. A hundred trillion bacteria, of several hundred different kinds, are said to live here.



THE BALANCE
BETWEEN THE
INTESTINAL
BACTERIA MUST
BE OFF, WITH
THE HARMFUL
BACTERIA
HAVING THE
ADVANTAGE.



Harmful bacteria

Include pathogenic Escherichia coli, Staphylococcus, and Clostridium. They break down proteins and make harmful byproducts.

...HARMFUL
BACTERIA
THAT HURT THE
BODY...

The balance between intestinal bacteria

A typical ratio in a healthy individual is 20% good bacteria, 10% harmful bacteria, and 70% opportunistic bacteria.

IN THE
INTESTINES,
THERE ARE
ROUGHLY
THREE
TYPES OF
BACTERIA:

Good bacteria

Include lactic acid bacteria, L. gasseri, and Bifidobacterium. They can help strengthen immune response and promote intestinal activity.

GOOD
BACTERIA
THAT BENEFIT
THE BODY...

...AND
OPPORTU-
NISTIC
BACTERIA.

Opportunistic bacteria

Include Bacteroides, nonpathogenic Escherichia coli, and Eubacterium. Neither helping nor harming the body, they work with whichever bacteria that have the advantage.

HE SAYS
"PROBLEM
SOLVED," BUT
HE SURE
ISN'T ACTING
LIKE IT...



YEAH...
PROBLEM
SOLVED...

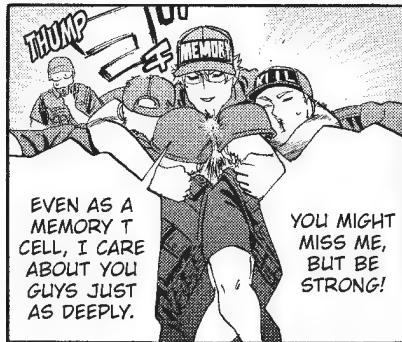
THEN
WE'LL BE
ABLE TO
FIND THE
FRIENDS
OF OUR
LITTLE
BUDDY
HERE!

IT'S SAID
THAT THE TOTAL
NUMBER OF
BACTERIA CAN
BE A HUNDRED
TRILLION.

WOW,
THAT
MANY!

SHIFTS IN THE
POWER BALANCE
BETWEEN THEM CAN
CAUSE CHANGES
IN THE HEALTH OF
THE BODY.





I SWEAR ON THIS HAT THAT I'LL COMPLETE MY MISSION.

THERE'S NO TELLING IF WE'LL ALL BE ALIVE WHEN WE SEE EACH OTHER AGAIN...



I WONDER
IF YOU'LL
BE ABLE TO
REMEMBER
THE ENEMY
WITH YOUR
REFLEXES
DULLED BY
PEACE?



WHAT'RE
YOU DOING
HERE?!
HUH?!

N-NO!
I'M NOT!
I'M NOT!
I'M NOT!
I'M NOT!
I'M NOT!
I'M NOT!

ARE YOU GONNA
CHUM IT UP WITH
SOME BACTERIA
FOR YOUR NEXT
SCHEME?!

TH-THAT'S
NOT TRUE.
IT MIGHT LOOK
LIKE IT'S TRUE
BUT REALLY
IT'S NOT.

AND WHAT
ARE YOU
DOING
RELAXING
WITH A
REGULAR
CELL?!

AT THIS
RATE YOU
WON'T EVEN
BE ABLE
TO KILL A
GERM!

UH... I
THINK I'M
MISSING
SOMETHING.

WHO'S THIS
"HE" YOU GUYS
KEEP TALKING
ABOUT...?

THEY'RE
MORONS,
ALL OF
THEM.

I AM NOW
PREPARING FOR
BATTLE. CELL BOY, IT'S
DANGEROUS HERE,
SO YOU SHOULD GET
SOMEPLACE SAFE.

NO,
THAT'S JUST
NOT POSSIBLE.
I'M A NATURAL-
BORN KILLING
MACHINE.

RIGHT!
RIGHT!

NUUUU!

WHAT'S THAT?
SQUEALING?

YEAH! YOU'LL
TOTALLY BE
IN OUR WAY
WHEN WE
HAVE TO
FIGHT HIM!!



CANCER
CELL?!!

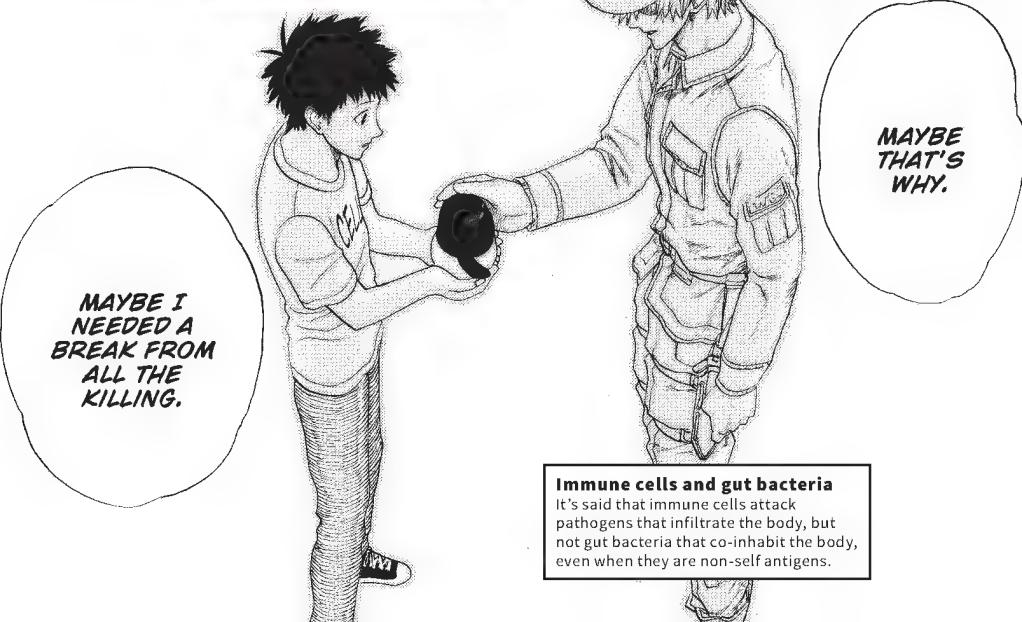
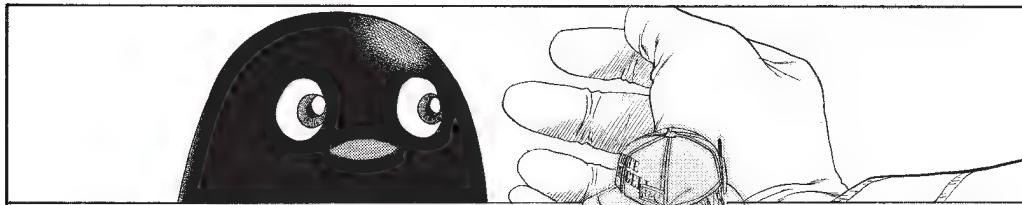
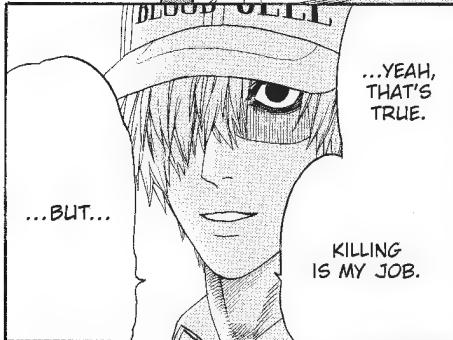
A
CANCER
CELL.

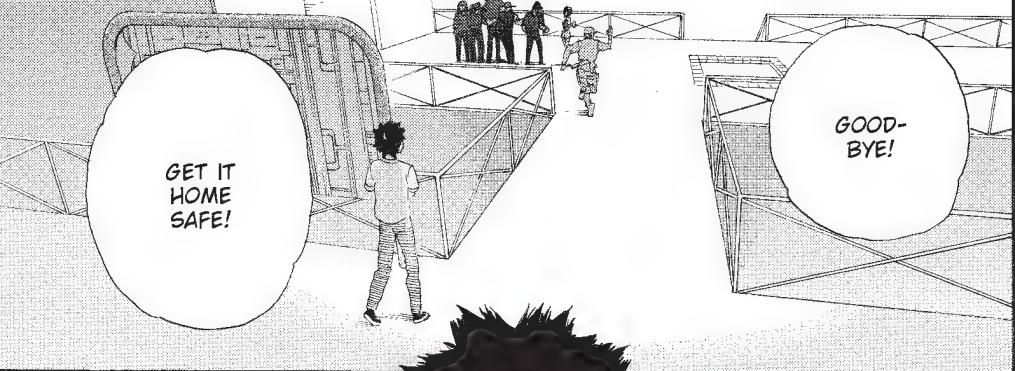
C...





WHITE
BLOOD CELL...
WHY DID YOU
PROTECT US?







...I WAS ALWAYS
BORED...
AND UNHAPPY...
AND LONELY.

SO I...
NEVER HAD
PLAYMATES
AS A KID...



THE CELL
THAT MADE
ME...

...WAS INFECTED
WITH SOMETHING
AND KILLED BY
AN IMMUNE CELL
SOON AFTER I
WAS BORN.

HEE
HEE
HEE.

NYUN!!
NYUU
NYU!!

...AND
TRAVELING
ALL OVER
THE BODY!!

SO
I HAD
A LOT
OF FUN
MEETING
YOU...

DON'T
GIVE UP,
GOBLET
CELL!!

IT'S NO USE!
THE BACTERIAL
ATTACKS ARE
TOO MUCH. IT'S
ONLY A MATTER
OF TIME!

Intestinal Epithelial Cells
Responsible for absorbing fluids and nutrients. They also build up a mucus barrier to prevent excessive immune response against the intestinal bacteria.

mucin
mucin
mucin
mucin

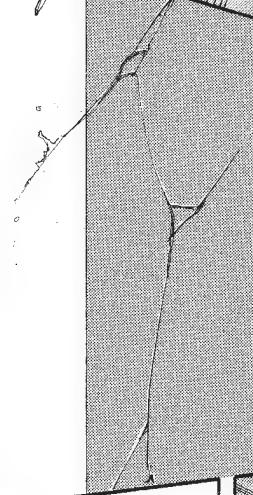
KACHUNK

Goblet Cells
Mucous secreting cells that secrete the viscous substance mucin. They also live in the small intestine, but are especially prevalent in the large intestine.

HUH?

GOBLET

KACHUNK



EEEEEEK!

SHOON

トドトドトドト
RR ROR AR

NO...
ALL THAT
MUCIN WE
PLANTED...

WHAT'S
THAT!?

AGH!



...THAT WE
HAD BEEN
WORKING
SO
HARD TO
REACH...!

HEH HEH
HEH...
SO THIS IS
THE OTHER
SIDE OF THE
INTESTINAL
WALL...

THERE'S NOT
EVEN A HINT
OF ANY STYLE
OR TASTE.

NOW THAT
WE'RE HERE,
IT'S NOT
MUCH TO
LOOK AT.

WHO CARES?
WE'LL TURN
THIS INTO A
PARADISE FOR
US HARMFUL
BACTERIA.

WE FIRST
HAVE TO
WIPE OUT
ALL THE
WEEDS,
HMM?

BUT
TO DO
THAT...

EEP...

HERE
WE GO!

AUGH!

BE COURTEOUS WHEN YOU
TRANSMIGRATE.

STEP

STEP

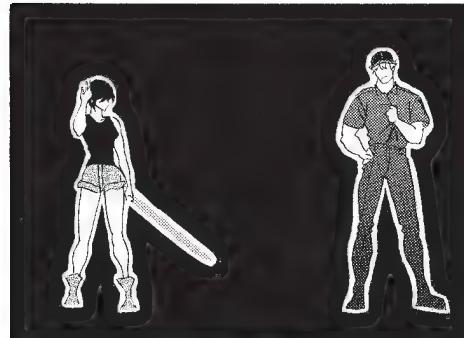
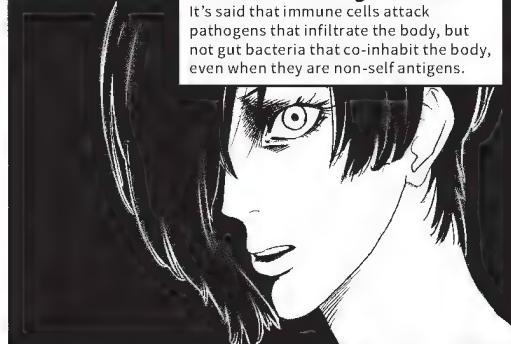
LYMPH DUCTS (TESTINES)

OH...
THE PATH
GETS
NARROW
HERE.

DRI
P

Immune cells and gut bacteria

It's said that immune cells attack pathogens that infiltrate the body, but not gut bacteria that co-inhabit the body, even when they are non-self antigens.



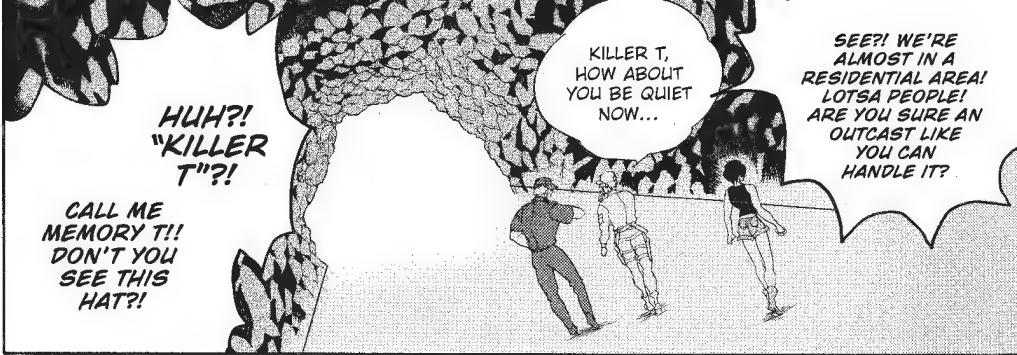


**WHY'RE YOU
FOLLOWING
ME?! YOU'RE
SUPPOSED
TO BE A
LONER!!**

**I SHOULD BE
TELLING YOU
THAT! AND YOU
BUMPED INTO
ME FIRST!!**

**HOW
WOBBLY
ARE YOU?!
GO HOME!!
YOU'RE
GONNA
GET IN THE
WAY!!!**

MY
YEARS OF
EXPERIENCE
AND
INSTINCT
SAY HE'S
THIS WAY!!
YOU'RE
THE ONES
FOLLOWING
ME!!



LOOKS
LIKE HE'S
COMING
STRAIGHT AT
US THIS
TIME.

CRACK



CRACK



CRACK





BLRRRK

GUH-

GRAB

THUMP

WHERE IS HE?!

BLRK

BLRRRK

BLRK

HEH
HEH...

SLASH

LEAP

NK!
GO!!

WHOOSH

!

O

DID YOU
COME BACK
TO LIFE...

DIE!

STAB

CANCER
CELL!!!

...JUST
TO COM-
PLAIN
SOME
MORE?!

DID
I GET
HIM...?!

AH HA
HA HA
HA HA
HA!

YOU FELL
FOR IT!
THIS IS
JUST A
PUPPET.

ニユ
ウ
P
S
H
H
H

THUD

WHAT-

NEMO

SO MUCH
WORK
JUST TO
TAKE
DOWN A
DUMMY.

YOU'VE GOT
YOUR WORK CUT
OUT FOR YOU,
IMMUNE CELLS.





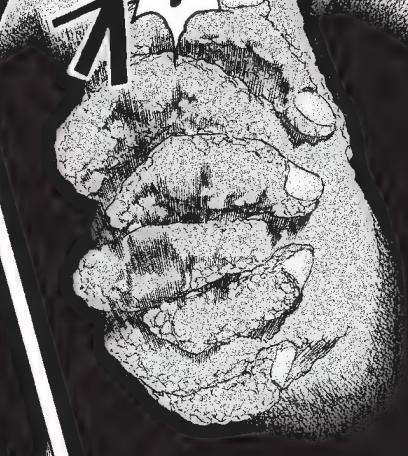
GASP!

WOOHOOOM

A AAAAAGH!



HA HAH
HAH...
I'M SO
HAPPY.
IT'S
THE SAME
THREE OF
YOU FROM
BEFORE.



THUD

X

GAH-

Y

Y

Y

Y

Y

Y

Y

Y

Y



Cancer cells

Cells that multiply uncontrollably due to a genetic anomaly. They overstep the boundaries with neighboring normal cells.

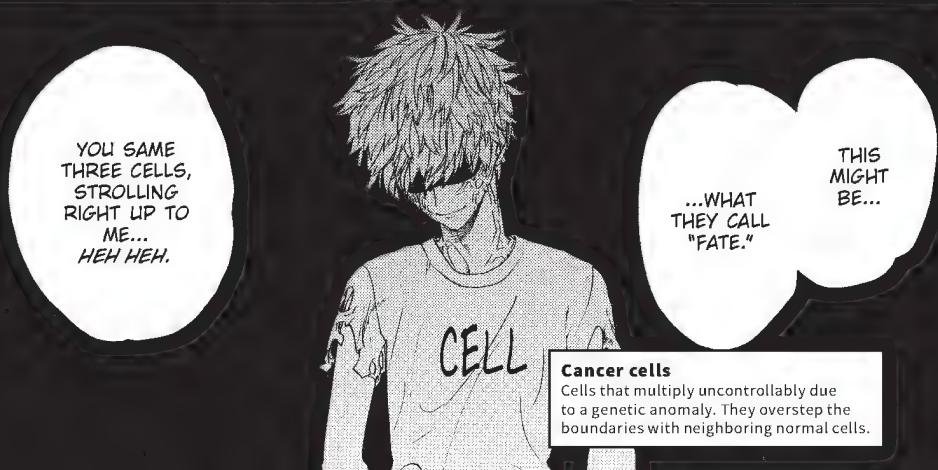
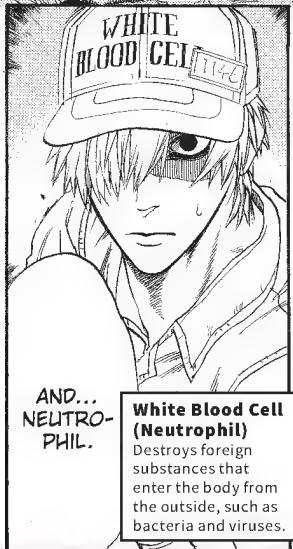
IT'S
GOOD
TO SEE
YOU.

CHAPTER 23: END



Cells at Work!

細胞



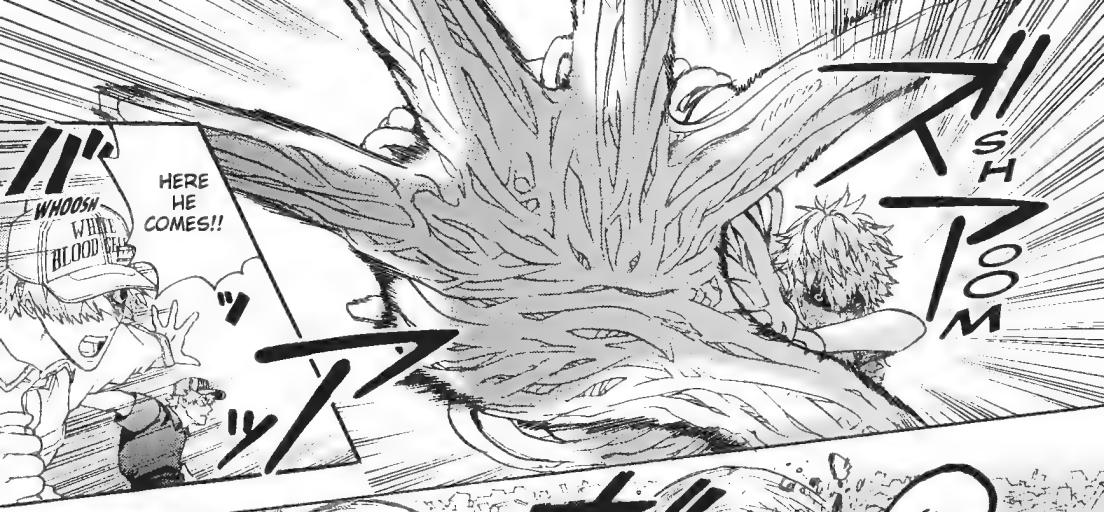
CHAPTER 24: CANCER CELL II (PART I)

...WHICH
OF US...

NOW
LET'S
DECIDE
ONCE
AND FOR
ALL...

....!!

...IS
ON THE
SIDE OF
JUSTICE.



GRAB

PPP



GAH!

DRAG

GAH!



WHAT
PREDICTABLE
ATTACKS.☆

HAH.

ば!! TA

DAH

HEY!! LINTIE
US BEFORE
YOU STRIKE
A POSE!!

THANKS,
NK!!

DID
YOU REALLY
THINK
YOU COULD
WIN THIS
TIME?

WHY
DID YOU
COME BACK
TO LIFE
KNOWING
YOU'D JUST
BE KILLED
AGAIN?

SO, KIDDY,
CAN YOU
TELL ME?

I
JUST...

...I'M...
...NOT
HERE TO
START A
FIGHT.

DON'T YOU
KNOW YOU
SHOULDN'T
START A FIGHT
AGAINST
AN ENEMY
WHO KNOWS
ALL ABOUT
YOU...? HM?

THIS
IS MY
SECOND
TIME
FIGHTING
YOU.

...FOUND
WHAT IT
IS I'M
SUPPOSED
TO DO.

BLORK

BLORK

BLORK

BLORK

I JUST
WANTED THE
THREE OF
YOU TO BEAR
WITNESS
TO IT.

CRACK

CRACK

THESE
ARE THE
SAME AS MY
PUPPET FROM
EARLIER.

CREEP.

HEH HEH...
SURPRISED?

CREEP

CELL

THERE'S
NOTHING
YOU CAN
DO TO STOP
THEM.

YOU
CAN'T KILL
THEM WITH
SWORDS.
...THEY'LL
KEEP MOVING
FOREVER.

THEY'RE ALL
A PART OF
MY TISSUE.

SHOON

SO SIT TIGHT,
AND YOU'LL
BE GOOD AND
CAPTURED SOON
ENOUGH.

DUNGE

YG 21

HNG!!

HUH?
THEY GOT
TANGLED...

MEMORY

SO YOU
WON'T BE
AS EASY AS
LAST TIME.

MEMORY
T CELL...
I SEE.

DASH

LEAP

I CAN
SEE—

YOU'RE
NOT
GETTING
AWAY!!

DON'T
UNDER-
ESTI-
MATE
US!

I, MEMORY
T CELL, CAN
SEE THROUGH
ALL OF YOUR
ATTACKS!!

...YOU'RE
GOING TO
DO NEXT!!

...EXACTLY
WHAT...

WEEEM
SSTO
SSTO



TEE
HEE.
♥

CATCH





LOOM

CELL

Regulatory T Cell

She regulates the activity
of T cells to prevent
immune system anomalies.







HAAH!
HAAH!

HAAH!

SPLASH

SPLASH

KACHUNK
KACHUNK

ARE THOSE
GERMS STILL
BEHIND US?!



Intestinal Epithelial Cells

Responsible for absorbing fluids and nutrients. They also build up a mucous barrier to prevent excessive immune response against the intestinal bacteria.

Goblet Cells

Mucous secreting cells that secrete the viscous substance mucin. They also live in the small intestine, but are especially prevalent in the large intestine.

I DON'T
KNOW!!
JUST KEEP
RUNNING!!



SPLASH

HOOOM
SPLASH
SPLASH

ALUGH!

CRACK



NYUUUUU...

Lactic Acid Bacteria

Good bacteria that helps the health of the human body. They have a variety of specialties.

W-WE'RE SURROUNDED!



WHAT DO YOU SAY TO THIS?

SHOOM

LET'S SEE YOU TRY AND PROTECT IT.

GAAAAGH!

NYUU!!

THE TOXIN ATTACK OF A HARMFUL BACTERIUM.

Effects of harmful bacteria

Examples of the damage done by harmful bacteria include intestinal putrefaction and the production of toxins and carcinogens. These can cause a variety of negative effects on the human body, such as drop in immune function, an unpleasant change in the smell of stools and gas, and diarrhea or constipation.

WE'RE GOING TO MAKE YOU SUFFER IN ALL SORTS OF WAYS.

EH
HEH
HEH
HEH

WE'RE COUNTING ON YOU TO ENTERTAIN US, LITTLE CELL.

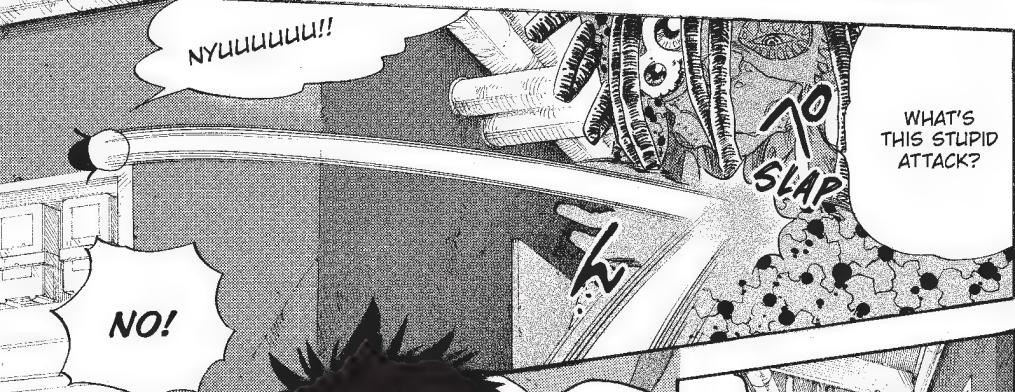
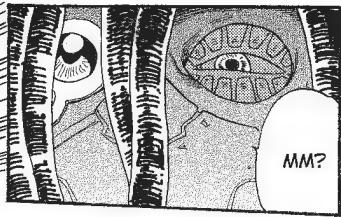
SO MAKE SURE YOU SCREAM NICE AND LOUD FOR US.

HA
HA

WE CAME ALL THE WAY TO THE OTHER SIDE OF THE INTESTINAL WALLS, AND WE'RE JUST HEARTBROKEN TO FIND WHAT A BORING PLACE IT IS.

GAH...

NYUUUUU!!!



GET AWAY,
LACTIC ACID
BACTERIUM!!

RUN
SOMEWHERE
FAR AWAY!!

NYU!

NYUUU
NYUUU!!
NYUUU!!!

FLAP FLAP
FLAP

DON'T
WORRY
ABOUT
ME!

THINK OF
YOURSELF
AND RUN!!





ARE YOU
READY?

MAYBE...

JUST
MAYBE

CELL

THE CELL
THAT
MADE ME...

FELT
JUST LIKE
THIS...
IN THE
END...



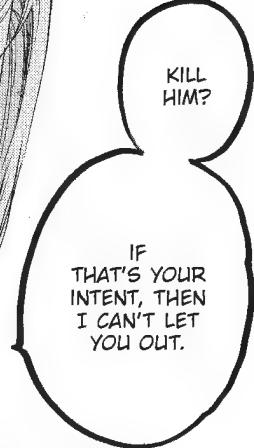




KILL
HIM?

The role of a regulatory T cell

Regulatory T cells have the ability to regulate the activity of immune cells so that they do not attack self cells or cells beneficial to the body. In this case, she is trying to suppress the attacks by the immune cells because the cancer cell is a self-borne cell and not considered a foreign substance (non-self).



IF
THAT'S YOUR
INTENT, THEN
I CAN'T LET
YOU OUT.



ISN'T IT FUNNY?
YOU NORMAL
CELLS ALL TAKE
YOUR JOBS SO
SERIOUSLY...

NO, YOU
MUSTN'T
ATTACK
A CELL.

KLAK

IT'S NOT
THAT SHE'S
BETRAYING
YOU GUYS.

CANCER
CELL...
I'M GOING
TO KILL
YOU...

THAT'S
THE LADY'S
JOB.

...WHITE
BLOOD
CELL...

...YOU
SPARED THAT
ORDINARY CELL
AND THOSE
LACTIC ACID
BACTERIA.

AND DESPITE
BEING SO
SERIOUS...

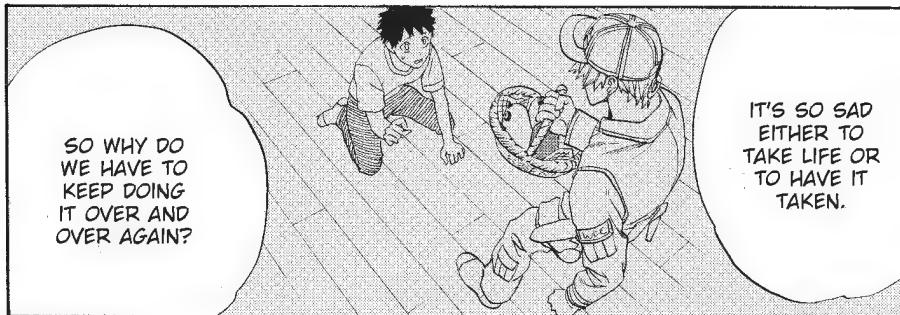
IT MADE
ME CHANGE
MY MIND
ABOUT SOME
THINGS.

NGH...

BUT IT
MADE ME
THINK.

YOU'RE
RIGHT.
I KNOW THAT.

THAT WAS...
I DIDN'T KILL
THOSE BACTERIA
BECAUSE THEY
WERE BENEFICIAL
TO THIS BODY!!



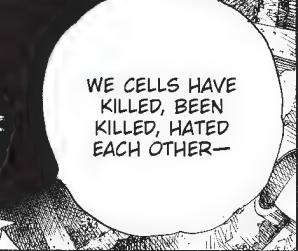


THE LIVES
OF TENS OF
TRILLIONS
OF CELLS, OR
THE SINGLE
LIFE OF THIS
BODY?

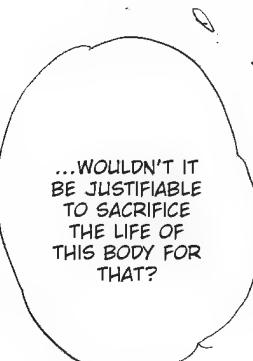


I WAS
KILLED, AND
YOU DID THE
KILLING...
WE'VE ALL
SUFFERED.

SACRIFICING
OURSELVES
SO THAT
THIS BODY
CAN KEEP ON
LIVING.



WE CELLS HAVE
KILLED, BEEN
KILLED, HATED
EACH OTHER—



...WOULDN'T IT
BE JUSTIFIABLE
TO SACRIFICE
THE LIFE OF
THIS BODY FOR
THAT?

EVEN IF
IT'S A MAD
WORLD BOUND
FOR DEATH,
IF WE COULD
REALIZE SUCH
A WORLD FOR
EVEN A
MOMENT...

...WHERE
WE CELLS
DON'T HAVE
TO KILL OR
BE KILLED?



WHAT IF
WE COULD
CREATE A
WORLD...









CANCER
CELL, DON'T
DO THIS!!!

RUMBLE

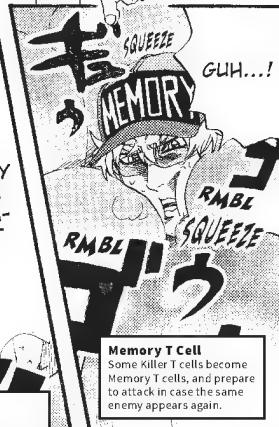
CHAPTER 24: END

Cells at Work!

細胞



CHAPTER 25: CANCER CELL II (PART II)









The role of a regulatory T cell

Regulatory T cells have the ability to regulate the activity of immune cells so that they do not attack self cells or cells beneficial to the body.





YOU WILL
NEVER DEFEAT
ME. YOUR
STRUGGLE IS
FUTILE.



YES... YOU'VE
ALWAYS BEEN
THE SAME.



BAD AT
STRATEGY...
AND SWAYED
BY EMOTION.



GIVE UP
AND CEASE
YOUR
ATTACKS.



UNABLE
TO FEED OFF OF
VICTORY, NOR
TO RISE ABOVE
DEFEAT. YOU'VE
ALWAYS BEEN
LIKE THAT.

NOOOOW.

WHATEVER
SHALL WE
DO WITH
YOU?

WE JUST
CAN'T DECIDE
WHERE TO
START
SLICING
YOU.

LOOM
"K!"

"K!"

WOOOW!

Opportunistic Bacteria

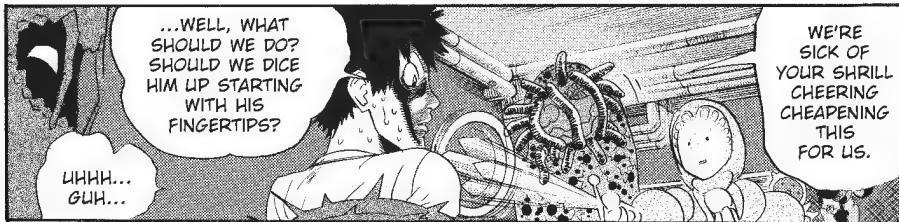
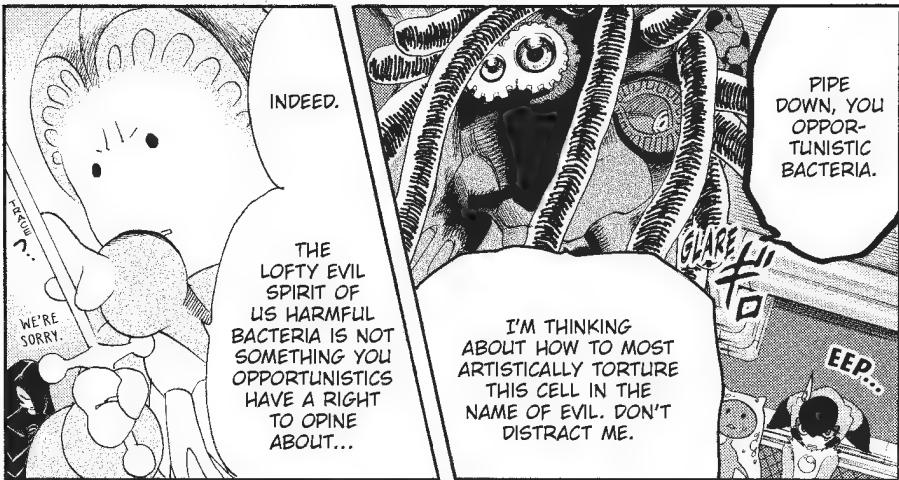
Include Bacteroides, nonpathogenic Escherichia coli, and Eubacterium. Neither helping nor harming the body, they make up roughly 70% of the bacteria in the intestines.

HOW ABOUT
YOU USE YOUR
TENTACLES
TO SLAM HIM
AGAINST THE
WALL?!

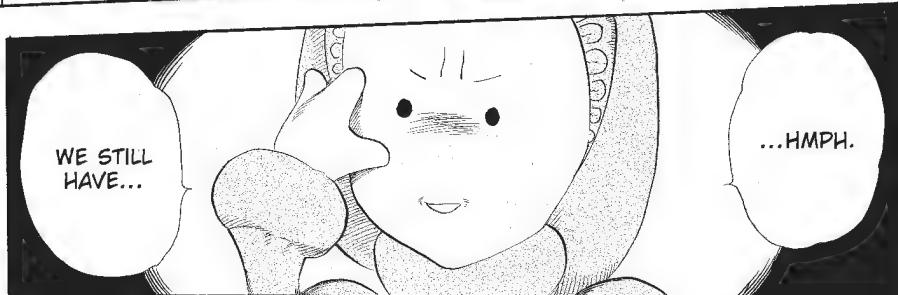
Harmful Bacteria
Include pathogenic Escherichia coli, Staphylococcus, and Clostridium. They break down proteins and make harmful byproduct.

WOOOW!♥
YOU HARMFUL
BACTERIA ARE
PROS OF EVIL
ENTERTAIN-
MENT!♥

I'M SO
IMRESSED!!
TO LET HIM
KNOW EXACTLY
WHAT YOU'RE
GOING TO DO
TO HIM—
HOW TERRIBLY
CRUEL
OF YOU!!!







...THE
ADVANTAGE IN
NUMBERS.

RUMBLE
RUMBLE

YOU SHOULD
BE ASHAMED...
ALLOWING
YOURSLEVS TO
DISPLAY SUCH
FOOLISH CONFIDENCE
IN AN ENVIRONMENT
WHERE WE HARMFUL
BACTERIA HOLD THE
UPPER HAND.

THIS
OVERWHELMING
HORDE OF
OPPORTUNISTIC
BACTERIA ARE
ON MY SIDE.

WHAT?!
THERE'S
SO MANY
MORE OF
THEM!!

EEP...

CRUMBLE
BOD CELL

VICTORY
ACHIEVED
WITH
NUMBERS
IS THE
HIGHEST
AESTHETIC
FOR US
BACTERIA!!
BWAA
HA HA!

NUMBERS!!
THAT'S
POWER!!

BOOM
BOOM

HA...
HA...

HA...

BOOM

BOOM

BOOM
BOOM

HUH
...?

BOOM

HUUUUH ??

BOMPF

BOMPF

BOMPF

RUMBLE

BOMPF

BOMPF

Good Bacteria

Include lactic acid bacteria, L. gasseri and Bifidobacterium. They can help strengthen immune response and promote intestinal activity. They act in ways that are beneficial to the human body.



A-ARE
THESE
GOOD
BACTE-
RIA?!

OPPOR-TUNISTIC
BACTERIA...
WHAT ARE
YOU DOING?!
GET RID OF
THEM...!

RUMBLE

SHAKE

SHAKE

GUUUGH...
IT ONLY TOOK
THIS MANY GOOD
BACTERIA TO
COMPLETELY
FLIP THE
SITUATION?

**Characteristic of
Opportunistic Bacteria**

They side with good or
harmful bacteria, depending
on who holds the advantage.

THAT'S RIGHT!
COULDN'T YOU
JUST TAKE A
COMPLIMENT INSTEAD
OF BLABBERING ON
ABOUT ART? HOW
HIGH-MAINTENANCE
ARE YOU?

EEP!

IT'S THE
AGE OF GOOD
BACTERIA NOW!!
IT'S TIME FOR
US TO JOIN
THE RANKS
OF BEAUTIFUL,
UPSTANDING
CITIZEN
BACTERIA!!

QUIT YOUR
YAPPING!!
THE TIMES
HAVE
CHANGED!!

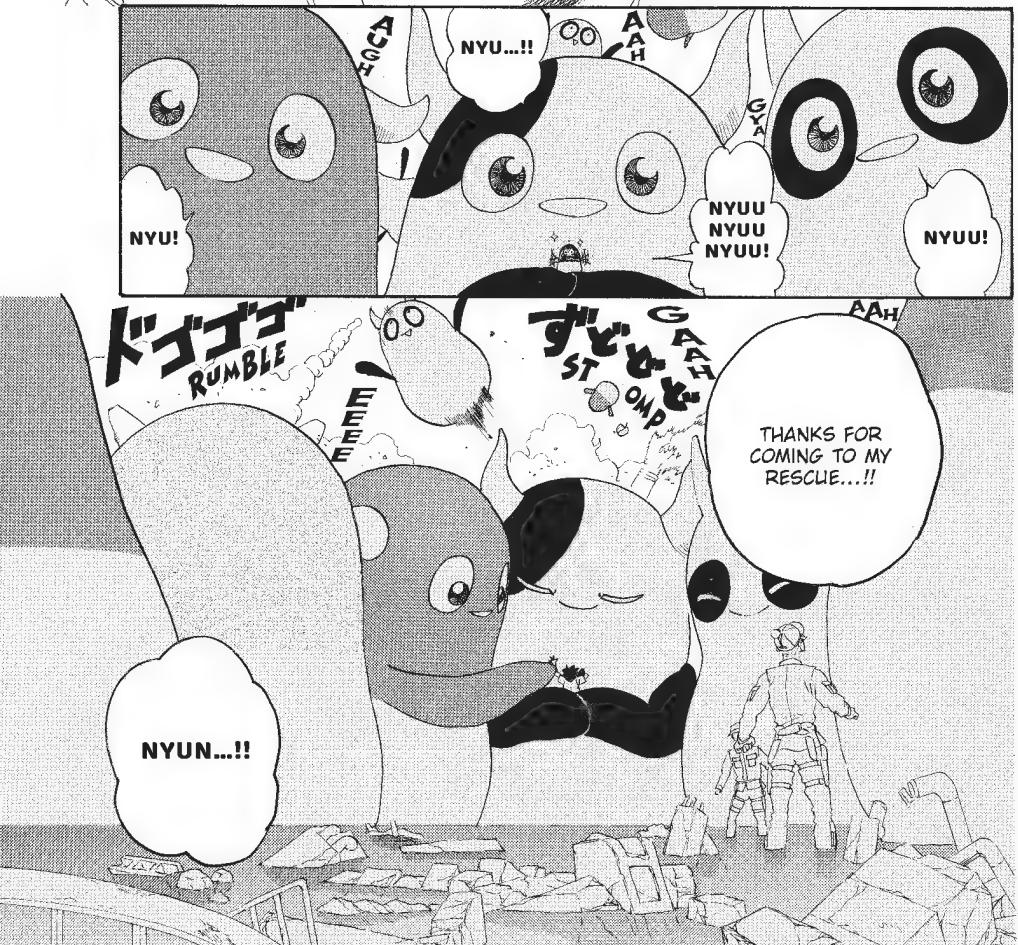
BOOM

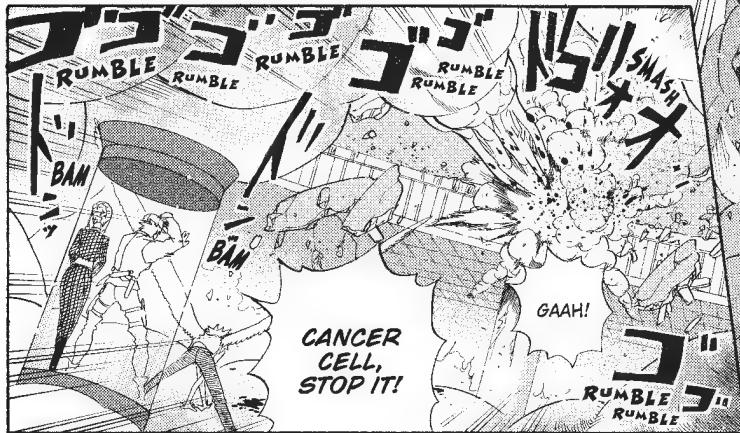
WE'RE GONNA
KILL YOU,
OBVIOUSLY.

LET'S ALL BE
FRIENDS NOW,
EVERYONE.♥



WAG
It
te
WAG
It
te
WAG





YOU'RE
JUST LIKE ME,
STRUGGLING
WITHIN A FATE
THAT WAS
DECIDED FOR
YOU!

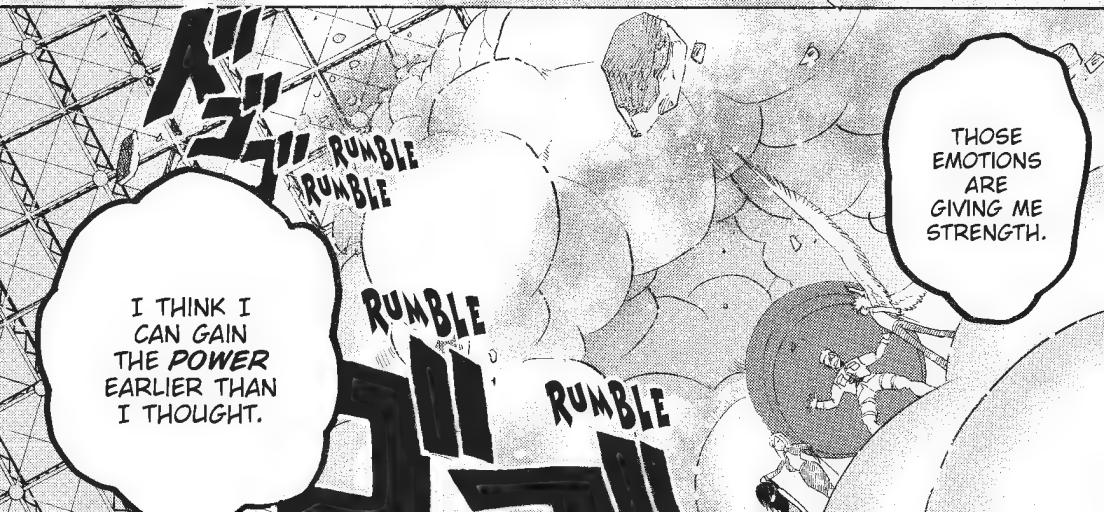
BECAUSE I
LIKE YOUR
CONTRADICTIONS.





I'M SO GLAD
I BROUGHT
THE THREE OF
YOU HERE!!

HAAH HAAH...
AH HA HA...
HA HA HA
HA HEH HEH
HEH!



DIVIDE JUST
30 TIMES AND
THERE'LL BE
MORE THAN A
BILLION OF MY
FRIENDS!!

GROW

GROW

A SINGLE
DIVISION TO
DOUBLE...
DIVIDE AGAIN
TO DOUBLE
AGAIN!

M SMILE



DON'T THINK
YOU'VE WON
JUST YET!!



TUG

AN
ULTIMATE
SECRET
TECHNIQUE
...!!



IT'S
CALLED
...

RUMBLE

RUMBLE

THAT IDIOT...
WHAT'S HE
DOING...?!

MEMORY
T...?!



T CELL
ULTIMATE
SECRET
TECHNIQUE!

PERFORIN
CANNON
PUNCH!!

BOOM

SECRET
TECHNIQUE...?

IT'S
T CELL
PER-
FORIN
CANNON
PUNCH
!!



WHAT'S
A T CELL
PUFF
PUDDING
PANTIES?

T. CELL'
PERF...
WHAT?

...?

T...
WHAT?

...?

BACK IN THYMUS SCHOOL

A CELL OF YOUR
TALENTS MIGHT
BE ABLE TO
MASTER THE
ULTIMATE SECRET
TECHNIQUE!

BUT
I'LL WORK
HARD AND
BUILD UP
THE SKILLS
I NEED...

HEY MAN,
YOU'RE
SOMETHING
ELSE.

Thymus

A lymphoid organ that
differentiates and
matures precursor T cells
into full-fledged T cells.

TICK
TWITCH

ULTIMATE...
SECRET
TECHNIQUE?

IT'S SO AMAZING
AND POWERFUL
THAT THE TARGET
IS BLOWN AWAY
AS IF STRUCK BY
A GIANT FIST.

IT'S CALLED
T-CELL
PERFORIN
CANNON
PUNCH!!

IT'S A LEGENDARY
MOVE THAT CAN
ONLY BE UNLEASHED
WHEN A T CELL'S
DESIRE TO PROTECT
THE BODY IS
HEIGHTENED TO ITS
LIMITS.

Perforin

A chemical released by Killer T cells
when they attack infected cells.

DESIRE...
GIANT
FIST...?

ULTIMATE
SECRET
TECHNIQUE...

AARUGH!
MY ARM
CRAMPED!

HE'S
REALLY
PRACTIC-
ING.
DIDN'T
THINK HE'D
BELIEVE
SUCH A
DUMB
STORY!

AS IF A
MOVE
LIKE
THAT
EXISTS!!
PFFFT!

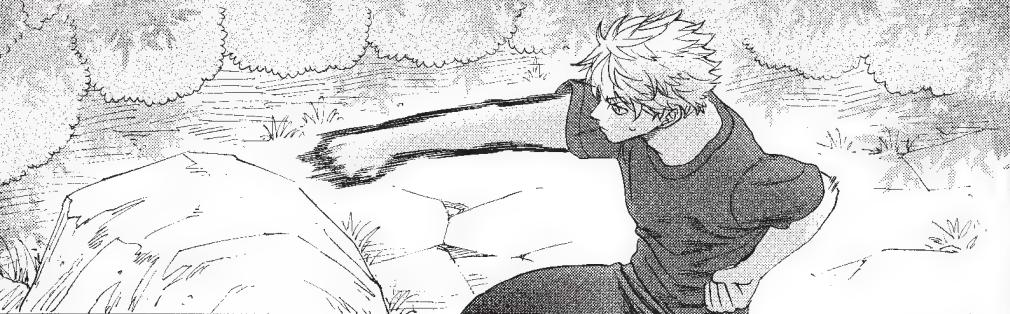
SNAP

T CELL
PERFE...
FOR IN
CANNON
PUNCH!!

I STAMMERED
A LITTLE...

THEY NEED TO
LOOK DOWN
ON OTHERS
TO FEEL
BETTER ABOUT
THEMSELVES.

WHAT'RE
THEY
DOING?





I'M
DONE
LETTING
YOU
HAVE
YOUR
WAY!

~~MEMORY~~

MEMOR



TAKE THIS!
T CELL
PERFORIN
CANNON
PLUNCH!!







WHAT
HAPPENED
TO SUP-
PRESSING
THEIR
ATTACKS
AGAINST
ME?!
WHY DID
YOU JUST
DODGE?!

HACK HACK!
WH-WH-WH-WH-
WHAT...WAS THAT
WEIRD MOVE?

MS.
REGULATORY—
MS.
REGULATORY
T CELL?!

...?!

...HAVE
MADE AN
ERROR OF
JUDGMENT.

I
SEEM
TO...

...YOU ARE...
UPON
CLOSER
INSPEC-
TION...

TWITCH

YOU WERE
NOT A
CELL TO BE
PROTECTED.

REALLY??!

YOU
TURNED
OUT NOT
TO BE A
CELL,
BUT A
"CEL"...

Boom

Lucky



SLASH

LIKE I
SAID...

SPLOOOSH

...I KNOW
ALL YOUR
MOVES
ALREADY.



!!

木

CRUMBLE

SNAP

...CUTTING
ME DOESN'T
DO
ANYTHING.

AND
LIKE I
SAID...

SNAP

SNAP

SNAP



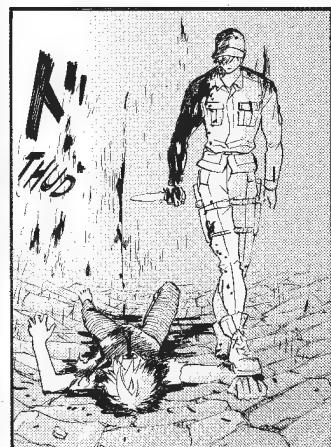
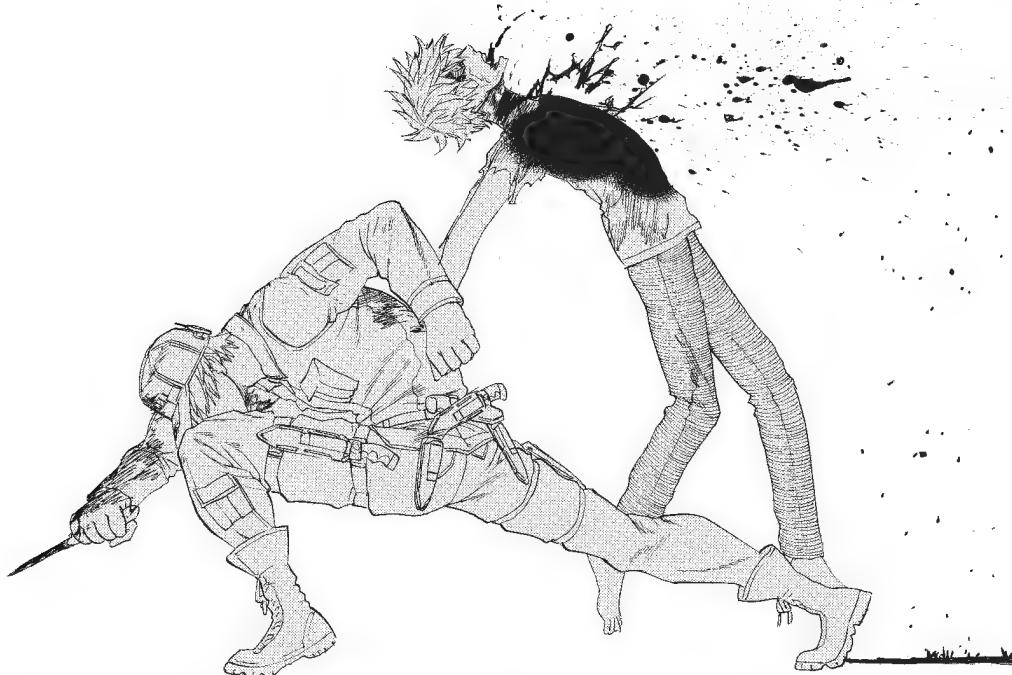
IT LOOKS LIKE
WITH THE SHIFT IN
THE INTESTINAL
ENVIRONMENT,
THERE'S LESS OF
THE TOXINS FROM
THE BAD BACTERIA
THAT WERE GIVING
YOU STRENGTH.



SLASH

WHITE
BLOOD
C-











Role of lactic acid bacteria

Some lactic acid bacteria are thought to interact directly with the intestinal wall to help maintain the functions of the intestinal barrier.

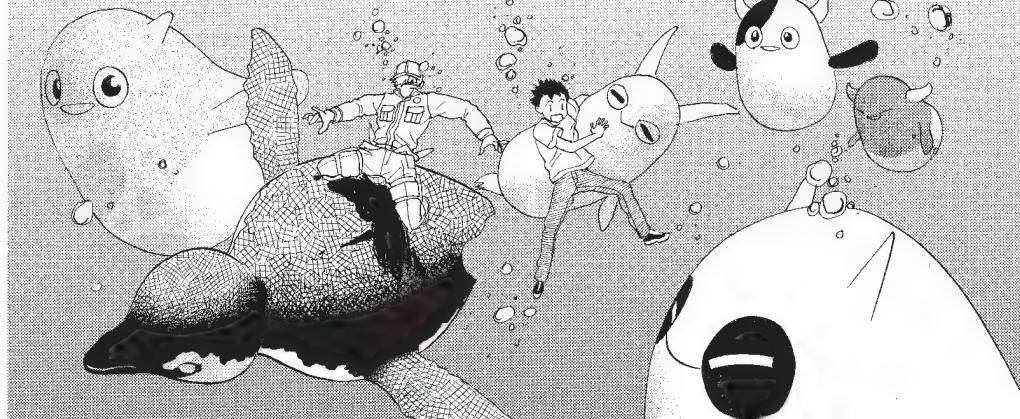
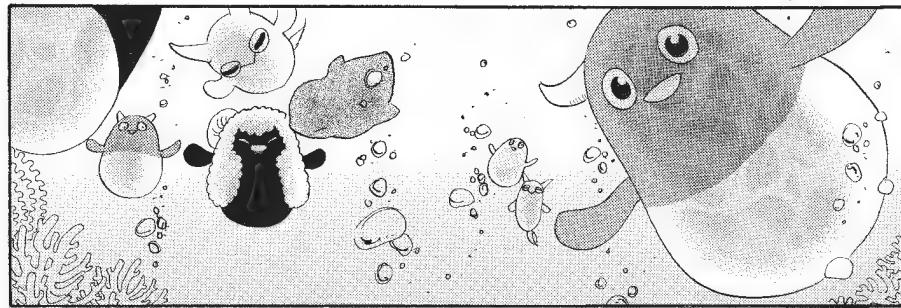
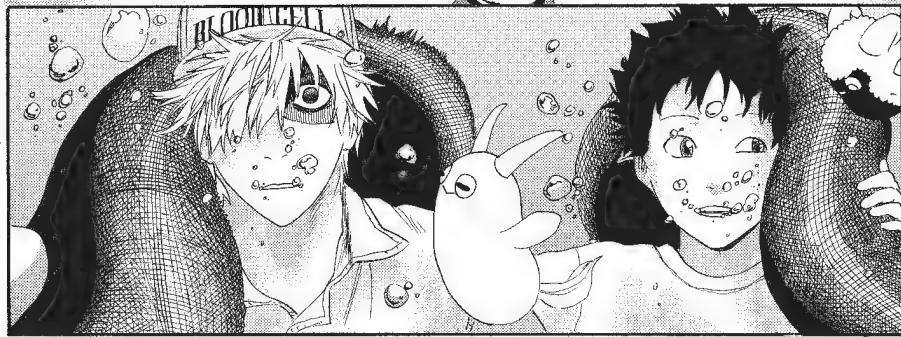




Intestinal flora (intestinal microbiota)

In the intestines, there are good, harmful, and opportunistic bacteria, numbering a hundred trillion with hundreds of types.







GOOD-BYE...

...LACTIC
ACID
BACTERIA.





CHAPTER 25: END

T CELL
ULTIMATE
SECRET
TECHNIQUE:
PERFORIN
CANNON
PLUUUNCH
!!!

NOW, LOOK
CAREFULLY,
NAIVE T
CELLS!! JUST
THEN, MY FIST
WENT LIKE
THIS—

WHOOSH

YUP...

JUST
LOOKS LIKE
A NORMAL
PUNCH TO
ME...

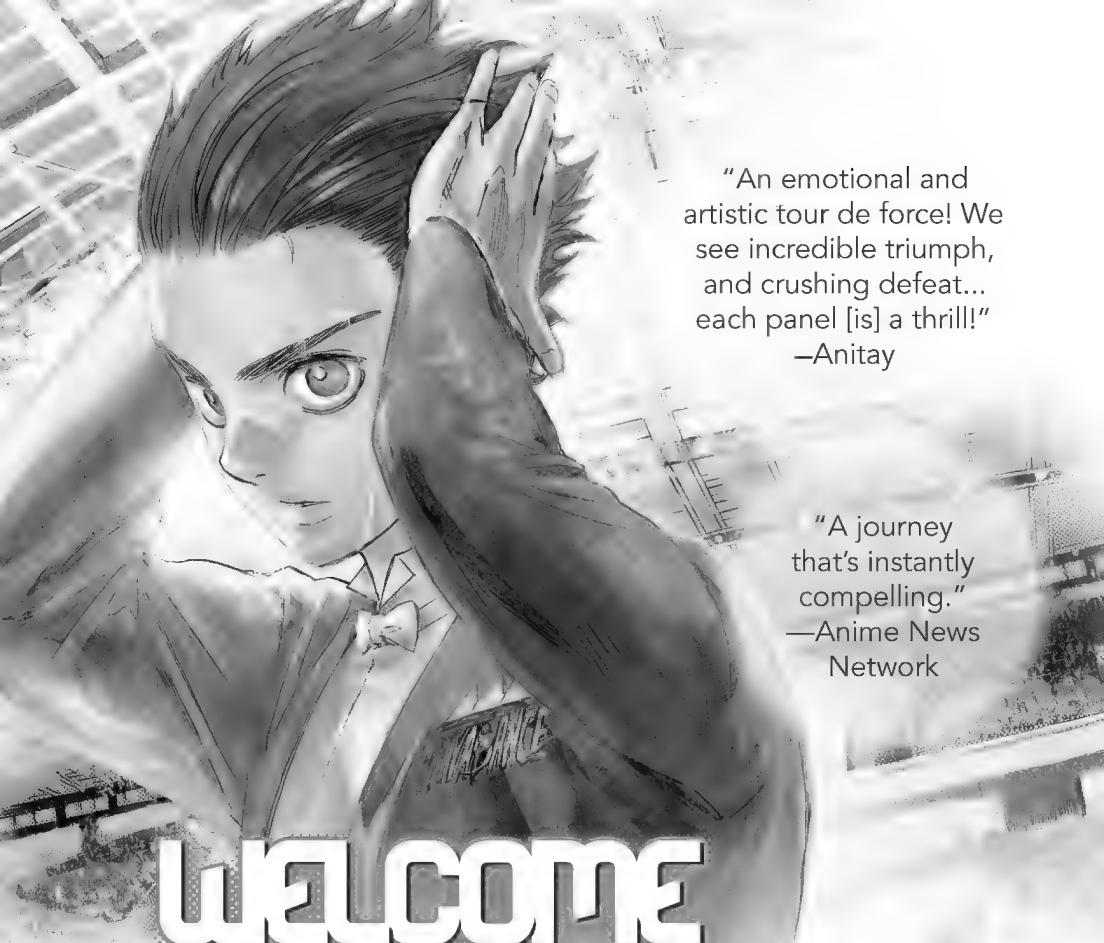


CELLS AT WORK! VOLUME 5: END

Medical Editor: Tomoyuki Harada

Cells at Work!

細胞



"An emotional and artistic tour de force! We see incredible triumph, and crushing defeat... each panel [is] a thrill!"

—Anitay

"A journey that's instantly compelling."

—Anime News Network

WELCOME TO THE BALLROOM

By Tomo Takeuchi

Feckless high school student Tatara Fujita wants to be good at something—anything. Unfortunately, he's about as average as a slouchy teen can be. The local bullies know this, and make it a habit to hit him up for cash, but all that changes when the debonair Kaname Sengoku sends them packing. Sengoku's not the neighborhood watch, though. He's a professional ballroom dancer. And once Tatara Fujita gets pulled into the world of ballroom, his life will never be the same.

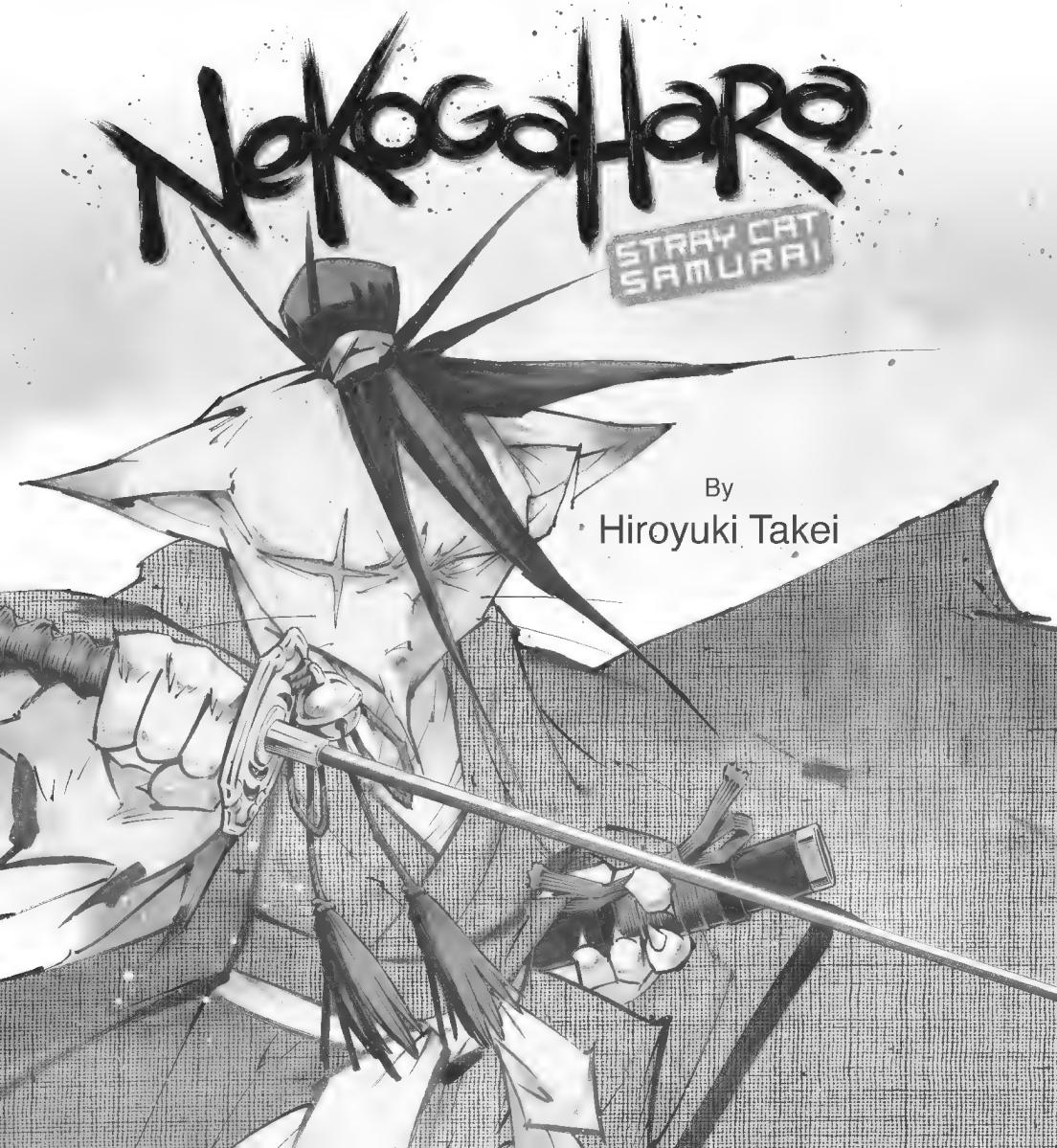




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New action series from Hiroyuki Takei, creator of
the classic shonen franchise *Shaman King*!

In medieval Japan, a bell hanging on the collar is a sign that a cat has a master. Norachiyo's bell hangs from his katana sheath, but he is nonetheless a stray — a ronin. This one-eyed cat samurai travels across a dishonest world, cutting through pretense and deception with his blade.



Japan's most powerful spirit medium delves into the ghost world's greatest mysteries!

Story by Kyo Shirodaira, famed author of mystery fiction and creator of *Spiral*, *Blast of Tempest*, and *The Record of a Fallen Vampire*.



Both touched by spirits called yōkai, Kotoko and Kurô have gained unique superhuman powers. But to gain her powers Kotoko has given up an eye and a leg, and Kurô's personal life is in shambles. So when Kotoko suggests they team up to deal with renegades from the spirit world, Kurô doesn't have many other choices, but Kotoko might just have a few ulterior motives...

IN/SPECTRE

STORY BY KYO SHIRODAIRA
ART BY HASHIBA KATASE

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HAPPINESS

—ハピネス—

By Shuzo Oshimi

From the creator of *The Flowers of Evil*

Nothing interesting is happening in Makoto Ozaki's first year of high school. His life is a series of quiet humiliations: low-grade bullies, unreliable friends, and the constant frustration of his adolescent lust. But one night, a pale, thin girl knocks him to the ground in an alley and offers him a choice. Now everything is different. Daylight is searingly bright. Food tastes awful. And worse than anything is the terrible, consuming thirst...

Praise for Shuzo Oshimi's *The Flowers of Evil*

"A shockingly readable story that vividly—one might even say queasily—evokes the fear and confusion of discovering one's own sexuality. Recommended." —The Manga Critic

"A page-turning tale of sordid middle school blackmail." —Otaku USA Magazine

"A stunning new horror manga." —Third Eye Comics



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The Black Museum *The Ghost and the Lady*

By Kazuhiro Fujita

Deep in Scotland Yard in London sits an evidence room dedicated to the greatest mysteries of British history. In this “Black Museum” sits a misshapen hunk of lead—two bullets fused together—the key to a wartime encounter between Florence Nightingale, the mother of modern nursing, and a supernatural Man in Grey. This story is unknown to most scholars of history, but a special guest of the museum will tell the tale of The Ghost and the Lady...

Praise for Kazuhiro Fujita’s *Ushio and Tora*

“A charming revival that combines a classic look with modern depth and pacing... **Essential viewing both for curmudgeons and new fans alike.**” — Anime News Network

“**GREAT!** The first episode of Ushio and Tora captures the essence of '90s anime.” — IGN

A new series from the creator of *Soul Eater*, the megahit manga and anime seen on Toonami!

"Fun and lively... a great start!"

-Adventures in Poor Taste



FIRE FORCE

By Atsushi Ohkubo

The city of Tokyo is plagued by a deadly phenomenon: spontaneous human combustion! Luckily, a special team is there to quench the inferno: The Fire Force! The fire soldiers at Special Fire Cathedral 8 are about to get a unique addition. Enter Shinra, a boy who possesses the power to run at the speed of a rocket, leaving behind the famous "devil's footprints" (and destroying his shoes in the process). Can Shinra and his colleagues discover the source of this strange epidemic before the city burns to ashes?

Cells at Work! 5

KODANSHA COMICS Digital Edition

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